

# COMPUTERWORLD

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NEWSPAPER



CV Photo by Ronald A. Frank

AT&T's Datapoint 40 display terminal is demonstrated by Cheryl Kaye who holds up hard copy of data on the screen.

## Products on Parade At ICA Conference

By Ronald A. Frank  
of the CW staff

BOSTON — AT&T chose the annual conference of the International Communications Association (ICA) last week to introduce its Datapoint 40 CRT terminal.

The Bell display unit was one of the equipment announcements by several suppliers at the communications users' show.

Among the products shown, GTE led the parade with a programmable display, key-entry

Teletype Model 33, while Interdata showed a store-and-forward message-switching configuration of its Model 50 CPU.

The ICA conference also included presentations by the major common carriers about existing and planned services as well as seminars and technical sessions dealing with interconnection, proper operating procedures for communications managers and regulatory discussions.

Characterized as an evolutionary extension of previous equipment supplied by Bell's Teletype Corp., the Model 40 is a modular partial LSI system with keyboard display printer (KDP), keyboard display (KD), and receive-only printer configurations.

(Continued on Page 2)



Paul Sternberger, system research manager with Dow Jones, checks out Western Union Data Services' Model 33 MSR tape cassette terminal with Brad O'Brien.

system and a communications management system. Western Union Data Services Co. added a magnetic cassette buffer to the

## 256K-Byte 360/30 Under OS Increases Multi-Job Capability

By Michael Weinstein  
of the CW staff

MILWAUKEE — There are presently around 5,000 users in the U.S. operating IBM 360/30 systems under DOS. Sometime this month, these users will be joined by at least one 360/30 user operating under OS Version MFT II with four times the memory of the largest standard IBM-supplied system 360/30 yet paying about 30% less rent.

The entire system is being installed by Commerce Group Corp. (CGC) here and consists of the central processor, 256K bytes of core memory, maintenance and software support, according to a company spokesman.

"An historical view held by many users is that OS will not run efficiently on a small machine as it requires much more overhead than DOS," the spokesman said.

"While it is true that our 360/30 running under OS has more overhead, the inclusion within the system of 256K bytes of memory enables the user to enjoy all the benefits of OS including improved handling of direct access space and improved utilization of main storage," the spokesman insisted.

15 Jobs Simultaneously

But possibly the major advantage to users running under OS is that it allows up to 15 jobs to be

run simultaneously, he added. Under DOS, users are limited to three partitions and thus can run only three jobs at any one time.

The firm does not envision users running the maximum of 15 simultaneous jobs, but can see definite benefits from running five or six.

"Because of the inherent superiority of OS, the multi-job capability will not degrade as the user adds more job streams, and so for a six-job-stream operation the Model 30 user can realize greater capabilities," he added.

The firm was hesitant to discuss actual benchmarks on the

system being installed but said complete statistics should be available to interested users in June.

The spokesman said a preliminary set of evaluations indicated the "super-30" would easily compete against the smaller end of the 370 line, even though the 370 machines have a markedly faster internal speed.

Sole Source Vendor

In offering the new system, Commerce Group is buying all the needed ingredients and will become a sole source vendor.

(Continued on Page 2)

## Cary Admits IBM Hired Some Competitor Engineers

By E. Drake Lundell Jr.  
of the CW staff

TULSA, Okla. — IBM moved to press its counterclaim in the Telex antitrust suit here last week, but Telex lawyers managed to turn the tables on IBM when IBM Chairman and President Frank T. Cary was called to testify.

In the counterclaim, IBM charges that Telex hired IBM employees in order to gain access to confidential IBM information. But under questioning by Telex attorneys, Cary admitted that IBM itself had hired engineers from competitors, particularly in the semiconductor area, and he hinted it had done so to catch up with developments in its competitors' laboratories.

Cary admitted IBM was lagging behind such organizations as Bell Laboratories and Texas Instruments in the development of field effect transistors for computer systems, and that during that time (late 1960s) IBM had hired engineers from those organizations.

Floyd Walker, the lead Telex attorney, introduced into evi-

dence a document that he said was a "scorecard" kept by IBM on its hiring program of key engineers from these other companies.

Earlier in the counterclaim activity, IBM called Richard L. Cary, son of Frank T. Cary, to the firm's San Jose plant, to testify he had been offered a 25% salary increase as well as a \$100,000

bonus by Telex to work for Telex to develop a 3330-type disk drive.

He said, however, that he would have resulted if he was able to develop the 3330-type system within 18 months after coming to Telex and he would have gotten another \$100,000 bonus if he was able to build and have installed 50 or more of the units within one year after the completion of development.

He said he told the Telex attorney, introduced into evi-

(Continued on Page 3)

## Controllers in 6025 CPU Low End of H6000 Grows

By Michael Weinstein  
of the CW staff

WALTHAM, Mass. — Honeywell has added a new computer to the low end of its Series 6000.

The Model 6025 is designed for present 11400 and H4200 users who want to upgrade to multi-job streams, time-sharing and network processing.

Competitively, the 6025 is designed as an alternative to IBM's 370/135 and 370/145. Burroughs' B-4700 and Univac's 9700 and 1106, a firm spokesman said.

To make the move to a 6025 more appealing, Honeywell is providing several transmission programs including Cobol-to-Cobol file format translations and assembly language-to-Cobol conversions covering IBM 360, Univac Series 70, Honeywell 200, 2000 and 400 computers. For those users moving up within the Honeywell line, peripheral interfaces are common between the 400 and newer

6025. System architecture of the 6025 features a 1.2 megabyte main memory in configurations of 320K, 384K and 512K bytes.

Following the lead of IBM, the controllers have been integrated into the mainframe. The Inter-

(Continued on Page 2)

## Watergate Spawed Fear of '72 Vote-Count Fraud

By E. Drake Lundell Jr.  
CW Washington Bureau

WASHINGTON, D.C. — With the tales of Watergate and other Republican political tactics rampant during the late stages of last year's Presidential campaign, officials in the McGovern for President situation room here became increasingly concerned that there would actually be tampering with the vote-counting process itself, especially in computerized vote systems.

"At first it was just a matter of academic concern, but when the reports started trickling in of the possible extent of sabotage to the election process, we really became worried," one of the planners remembers.

"We were especially worried about the large computerized counties," since a change in the count by a small amount there could have a large effect on the outcome of the campaign, according to Eli Segal, an official with the campaign at that time.

Because of this fear, the campaign set up a special section to deal with possible computer frauds in the vote-counting process and to hire an outside consultant to give seminars in several states on what to look for in possible vote tampering, he said.

Segal said, however, that the effort was "too late and too short of money" to really be

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## Products on Parade at ICA Show

(Continued from Page 1)

The Model 40 will operate at 1,200- or 1,050 bit/sec in ASCII code. It includes a display buffer memory with a capacity of 72 lines of 80 characters each. In addition to scroll and blink features, the CRT has a cursor to allow the operator to see a "reverse image" (black character on white color background) of the character in the buffer.

The terminal has a Home key that can be triggered remotely to allow unattended retransmission of data. First deliveries are scheduled for August of this year with three-month delivery cycles projected for 1974, AT&T said.

The Datapad 40 will later include a cluster capability to allow multiple displays to share a line. In addition, a wide platen printer, larger memory size and a tape cassette compatibility are under consideration. The initial model will be compatible with the Bell 4210 magnetic cartridge unit now available with teletypewriters.

The Model 40 will not be available from Bell for customer-provided data sets, according to an AT&T official.

## Honeywell Adds to Series 6000

(Continued from Page 1)

grated Control Unit contains disk and unit record control functions in addition to the system controller and the Input/output Multiplexer. Magnetic tape controls are external to the central processor.

A major feature of the 6000 Series is the ability to run in a multiprogramming mode. The General Comprehensive Operating Supervisor (GCOS) common to the 6000 Series allows users to run con-

## 360/30 Under OS Stores 256K Bytes

(Continued from Page 1)

"We are not suggesting to users that they get the central processor from one source, the memory from another and the software and support from us. We intend to provide everything in one package," Burton said.

The OS Model 30 (central processor and 256K-byte memory), will be offered to users on a three-year leasing arrangement for about \$3,500/mo with maintenance extra.

A more typical system including three 2314-type disk subsystems, four tape drives, printer and card equipment will lease for about \$7,600/mo from 6001 N. 91st St., St. Louis.

A 360/30 with 64K bytes of memory and the same peripherals from IBM would lease for about \$11,000/mo.

This decision was based on similar configurations involving teletypewriters where the telephone company must have control from the terminal out to the line in order to properly maintain the system, the official added.

But an OEM version will be supplied by Teletype Corp. at a later date and will be interconnected with non-Bell data sets.

### Built-In Diagnostics

To facilitate maintenance, the Model 40 contains extensive built-in diagnostics to allow internal functions to be displayed on the screen by Bell field personnel. Among the type of functions that can be monitored on the screen are vertical and horizontal alignment, character generation and test messages for line problems.

The KDP will cost about \$175 to \$195/mo; the KD version will be priced at \$110 to \$125/mo; and the RO model will cost \$150 to \$160/mo. Bell has not yet filed a tariff for the KDP but the first interstate application is expected later this year.

Sometime in 1974 a synchronous model will be added to the initial ASCII version. When the cluster capability is introduced,

current multidimensional processing—local and remote batch, transaction processing, message-switching, time-sharing, direct program access, interactive remote job entry and on-line document entry—all from a common data base.

Some of these functions (remote batch, transaction processing, time-sharing, message-switching and direct program access) are performed by software resident in the Front-End Network Processor (see p. S21).

Two software systems—GRTS and GPS—are available for this purpose.

### Module Coordinates

Coordination of all I/O operations between the peripherals and the central processor is supervised by an input/output multiplexer (IOM) module. Data is transferred at about 1 Mbyte/sec.

The 6025 operates with standard 6000 Series peripherals and can be connected with either the Datapad 305 or Datapad 355 communications processors.

A minimum 6025 system configuration might consist of a central processor with 80K words of memory, console, printer, card reader, three tape drives and two DSU190 disk drives (200 Mbytes on-line storage) and would rent for \$18,000/mo on a three-year lease.

A typical system configuration with communications capabilities would rent for about \$21,000/mo on a three-year lease with a large system renting for about \$29,000/mo.



On Photo by Richard A. Frank

**Penny D'Antonio**, GTE systems programmer, developed the software for the Generalized Communications System introduced at the show.

a controller/multiplexer unit will be part of the configuration, an AT&T source said.

Among the other products introduced to the more than 400 users at the conference was a cassette version of the Model 33 TTY from Western Union Data Services Co.

The Model 33MSR single-cassette unit can be used in conjunction with the cassette serving as the storage buffer. The 33MSR can transmit at 1,200 bit/sec and can retransmit data under remote CPU control for polling applications.

The KSR model will cost \$116/mo while the ASR unit will cost \$129/mo. One-year lease rates for the same units are priced at \$108 and \$121, the company said. First deliveries are scheduled for August.

### GTE Display

GTE Information Systems included a programmable CRT system and a Generalized Communications System data management system as part of its line of equipment introduced at the show.

The 7800 is plug-compatible with IBM 360/370 programmable CRT systems, and the binary synchronous system can be used in both cluster and stand-alone configurations. Prices for the stand-alone model start at \$130/mo.

The data management system combines hardware and software to give the user a complete communications/file management system.

The system features the Tempo II processor (now called the IS 1000) with up to 64K words of storage. A typical configuration including six Videomaster displays, processor with 24K words, 224 bytes of Ampex disk storage and necessary software will cost about \$110,000, a spokesman estimated.

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## Cary Cites 'Very Bad' Year

# Plug-Compatible Peripheral Competition Stiff in '70

TULSA, Okla. — The trend of IBM was "very bad" in 1970, Frank Cary, IBM president, told the court here last week in the \$1.2 billion antitrust suit by Telex.

Because of that, he said, IBM had decided to compete against the plug-compatible peripherals makers instead of losing any more business to them.

Because of the competition, Cary claimed IBM had to cut prices on tape and disk equipment or get out of that business.

### Unrelated Decisions?

But at the same time he denied allegations that IBM had increased the prices on CPUs in order to make up for the revenue lost by the fixed-term plan and other price-cutting actions in the peripherals area. The two decisions were unrelated, he said.

Cary said IBM had the worst sales record in its history in 1971, even though he claimed the firm's revenues were up slightly that year.

Cary admitted it cost IBM only \$8,690 to manufacture a dynamic address translation box and that the unit was built into the 370/158 at an increase in price of only \$5,000, but it was being sold to purchase equipment customers for \$200,000.

When Judge A. Sherman Christensen questioned why the Telex attorneys were pursuing this line of questioning, they replied the DAT box pricing was another example of IBM monopolistic pricing since it was sold at a 200% profit to owners of IBM machines.

Christensen said, however, the subject was "too peripheral, if I may," to the main part of the case and the subject was dropped.

Cary noted the recession of 1970 had caused major problems for IBM because users were cancelling their 30-day leases with IBM. He said the firm had taken major action to overcome the problems

including a freeze on hiring, but they had remained at the end of 1971.

IBM's competitors in the systems market, he admitted, had done better than IBM during the 1970 period, even though he did not know exactly what their business plans had been for that time.

He denied that the fixed-term plan price decreases had been made solely to boost the morale in the field so that there would not be a bad marketing reaction when the price increases on CPUs were announced later in the year.

He testified that after the 360 announcement IBM had decided in the future not to announce all systems in a computer family at the same time but to announce the different parts of the systems as they were ready.

### Market Definition

Earlier in the case IBM had called economist Frank Fisher of MIT to testify

on the issue of how to define the relevant market in such a case.

Basically, Fisher said, the market definition used by Telex was too narrow and the relevant market should include all competition — and not just the competition for plug-compatible equipment.

He said the market should be defined to include time-sharing, service bureaus and other computer systems that compete against the IBM ones.

Bob Evans, president of IBM's Systems Development Division, also testified that IBM had never withheld product technical advances from the market to keep competitors off balance.

He admitted, however, that he was part of a task force in 1970 that had recommended that IBM cut the prices on its peripheral equipment to beat the competition, but he said this idea was rejected and the engineers were ordered to try to develop superior machines instead.

## IBM Admits Hiring Practices

(Continued from Page 1)

executives who interviewed him that the project couldn't have been completed in that short a time span, but he had discovered ways to improve the 3330 while working for IBM.

The Telex officials, he said, weren't interested in the improvements, only in getting a 3330 into production in the 18-month period.

Wilmer also testified he had worried about taking confidential information away from IBM, especially because IBM was then using Memorex and an ex-IBM there for alleged trade secret violations.

Because he felt the time limit was unrealistic and because his conscience bothered him, Wilmer said he rejected the Telex offer.

However, on cross examination, Wilmer admitted the 3330 had already been announced when he was interviewed by Telex and that many of the specifications were in the public domain.

He also related that after the unit was delivered there would have been even less trade secret information that he would have which could not be gathered by others from the units in the field.

He did not have a contract with IBM, he claimed, that would have kept him from leaving the firm and IBM could not prohibit him from using his general knowledge if he went to a new employer.

The next witness for IBM, Forrest Wade, an engineer on the 3330 control unit project at the time he was offered a job by Telex, testified he was offered a 25% pay increase and a stock option if he would go to Telex to develop a similar controller.

He rejected the offer because he felt Telex only wanted him for that one project and it would let him go after it was finished, Wade stated.

In addition, he noted the security at the San Jose plant had become extremely tight after it was discovered that some IBM internal documents had been taken.

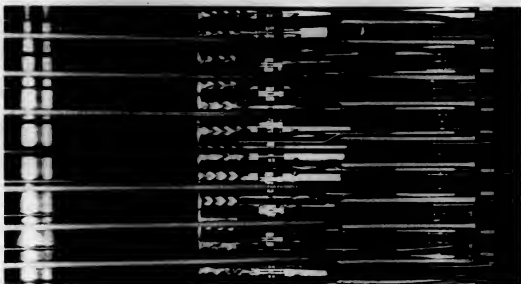
In the area of security, Bob Evans, president of IBM's Systems Development Division, said the group was now spending \$2 million more yearly than it had in 1969 for security measures in order to protect against the loss of trade secrets.

Evans added this increased security was "throttling" communication between engineers in different parts of the company.

But, he added, "I can't tell you how demoralizing it is for a development team to work three to five years... and then to find within a short time that competition has developed a duplicate" for the product.

# DS-330

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## IBM Papers Reveal

# FS Series to Replace 370s

TULSA, Okla. — Several IBM documents revealed here in the Telex vs. IBM antitrust suit indicate three systems on the drawing board as part of the IBM FS series of computer systems.

The smallest system in the line is identified as the FS-0 and is seen as a replacement for the 370/135 and lower. The announcement date is found in some documents as December 1976, but other

of the 135 market and the 145 marketplace, even though details are hard to find in the documents.

Apparently IBM has decided to go ahead with two CPUs in the large systems area, the FS-2 and the Thrush, with the FS-2 being equal to the smaller of the two systems described above.

According to one product plan the FS-2 will have four times the internal performance of a 135 and will carry a cost of 15% above the 135's.

The Thrush is scheduled for announcement in December 1976 and will be the follow-up to the 165 and the 195, according to this source.

## The Future Systems

papers seem to indicate the announcement of the entire FS series has been moved to 1975, with customer deliveries a year later.

FS-1 will be the next larger system and will apparently be aimed at the upper end

# System Q to Need Relocate Hardware to Multiprocess

By E. Drake Lundell Jr.  
Of the CW Staff

TULSA, Okla. — "System Q" is the code name for the operating system that IBM is currently developing on a worldwide basis for the FS (Future System) series of computers. And users should be expecting some indication of the system at future releases of present IBM operating systems will probably be made with integration into System Q in mind.

According to documents released here, "Q is an architecture of subsystems (comprising hardware and/or software subsystems)...which provide a maximum realization of the marketplace requirements."

The system, the documents noted, "is constructed to rigid interface definitions which allow decentralized worldwide development, multiple implementations with differing price/performance characteristics, and facilitates the integration of dispersed activities."

"To this end, Q requires the existence of relocate hardware as a fundamental characteristic and uses that facility to guarantee the integrity of its interface definitions," the previously secret report showed.

Because of the development effort on Q, the document stated that "all present generation systems...are interim to Q. Their planned extensions are assumed not to violate the general ground rules of compatibility...established between these systems and Q."

On both the NS or 370 line, as well as on the new systems being developed, relocate hardware will be needed to be able to run System Q, the IBM planners noted.

In addition, the System Q, as well as the FS series of computers, will be designed primarily for multiprocessing systems, the documents showed, rather than for sim-

plex systems as are present operating systems.

"The basic design of Q will provide for N-Plex multiprocessing where simplex operation is treated as a subset (or minimum) configuration," the documents said.

"Support will provide for asymmetric configurations but be able to take advantage of any symmetry that exists including fully symmetric systems."

"No assumption or predefinition is made as to the form of interprocessor connection (shared core or cable connected) but recognition is given to the single operational environment that exists so that the configuration can be fully exploited, according to the documents."

Besides requiring relocate hardware and designed largely for multiprocessor configurations, System Q will also have greater capability to support sensor-based applications than the present IBM operating systems.

## The Future Software

"The system should provide for full function with viable performance at a given configuration of hardware. Traditionally minimum configurations have been stipulated in terms of core storage size, such as 40K or 256K or 512K bytes of storage."

"This has been true for two reasons. First, core storage has been a significant contributor to the cost of the entire computer and as such had to be minimized. Second, core storage constraints determined performance levels and the functional content of the system."

"For multiprocessing, the marketplace will demand in this time frame [the intro-

costly duplications caused by fraudulent misrepresentation.

"Recipients have been prosecuted for receiving aid to which they were not entitled in as many as 22 jurisdictions simultaneously," he added.

Under the proposed system, when a state or county receives an application for welfare, it could check the national index to see whether the person is receiving public aid from another county or state.

Peterson indicated it would also benefit the recipients. If a recipient moved, he would not necessarily have to reapply for aid — his records could simply be transferred.

Input for the system would come from the states but the files would be maintained and paid for by HEW, according to the association's plan.

Target date for the beginning of such a national project is Jan. 1, 1974, Peterson said.

## Some Virtual Considerations by IBM

TULSA, Okla. — If you have a virtual 370 system installed and your IBM sales representative is pushing you to add more applications to the system because it won't cost any more, watch out.

In marketing considerations that were mullied over by IBM when deciding to introduce virtual, it was noted that "once a relocate system has been installed, the salesman will be more able to convince the customer to add new applications because initially little or no new hardware will be required. ("Relocate" hardware apparently is IBM usage for dynamic address translation.)

Among the other marketing considerations given by the firm for going to the virtual was the cost of conversion.

"The IBM salesman will have a new concept involving new function to sell, as opposed to just a straight price/performance kind of product. This is the environment in which he has performed best in the past. He will have considerable flexibility in putting together a sales story for each particular customer."

• "Because of the new function, the relocate system will tend to attract the purchase customer who had generally been resistant to simple price/performance offerings."

It will be a multiprocessing system but will have an internal performance two to eight times the performance of the 195

"and will offer a three to four times price/performance improvement," according to this document.

duction of Q) make it impossible to define a system which can reside completely in core storage," the IBM planners added.

"The necessity to bring the system to and from auxiliary storage devices as the needs arise adds further complication to the already complex system."

Therefore, they said, "the minimum configuration will be some combination of CPU speed, core storage size, auxiliary devices and channels and some miscellaneous equipment."

"The ultimate concern is really cost in dollars to the prospective installation. Accordingly, the minimum configuration will be compatible with the present user systems, although the exact approach has not yet been decided."

"The actual dollar figure will be derived as the design moves forward and the actual physical requirements of the system become known and the price/

performance tradeoffs can be determined."

But even though System Q apparently designed primarily for what would be considered large-scale users today, the IBM planners plan to extend these features downward with the new system.

"It is a market requirement of the seventies that the facilities stipulated in these requirements be extended to users that are at present considered small-scale users," the report noted.

System Q will be announced for the 370 systems that have a relocate feature during the second quarter of 1974 and will have its first customer shipment a year later, if the firm sticks to its present announcement schedule.

The announcement of Q on the FS series will be made when that series is announced, which is presently expected to be in the first or second quarter of 1975.

## Q 360/370 Compatibility Assured

TULSA, Okla. — System Q is still in the development stages, but the IBM software researchers have determined it will be compatible with the present user systems, although the exact approach has not yet been decided.

For second-generation systems, integrated emulation will be used to assure compatibility, the documents released here showed. But for the third generation the solution may be harder.

"For the third generation systems," the documents said, "one or more of the following will be used:

A. "Coexistence via the virtual machine or virtual operation system approach. Coexistence allows a current user to run his entire current generation system under the auspices of the Q system until he is able to transfer [sic] into the new system."

"The user can elect to convert one or more of his applications to operate directly under Q and continue to run other unconverted applications under Q as they do today (say, under OS/360). Both the converted and unconverted applications run at the same time under System Q within the same hardware. This is the emulator concept carried to the extreme case where the entire current generations system, including the software as well, is integrated under one new hardware/software System Q."

"The technique is not restricted to OS/360 or DOS/360. One or more of any programming system which runs on OS/360 or 370 or other hardware will operate at the same time under the auspices of System Q."

"When operating on old program within a new system structure, the cost performance of the new sys-

tem will be at least the same as executing the same program in its native environment that is, if one calculated the cost of running a job on the current system as, say, \$100, then the cost of running the same job in the new system will not be greater than \$100. Furthermore, the job, when all other factors are considered equal, will take approximately the same time to execute.

B. "Program, data and operational control compatibility via support of the 'Interchange Environment' that provides:

1. High-level language (Fortran, Cobol, PL/I, etc.) common compatibility for source programs.
2. Data interchange (compatibility) via AM/I (Access Method/I) and BSAM data structures.
3. Operational control interchange via the Common Command Language."

C. "Within its implementations on NS (370) and FS, Q will maintain both upward and downward compatibility for programs and data."

However, where conversion of programs is necessary, IBM is already planning to help the users.

"Where conversion of programs and/or data is required to obtain the improved performance or additional functions offered by Q, conversion aids will be provided to make the transition as easy, economical and painless as possible," the IBM planners promised.

"However," they noted, "by providing the coexistence capability, conversion will become an installation option rather than a mandatory requirement."

## National Welfare Index Proposed

By Judy Kramer  
Of the CW Staff

NEW ORLEANS — A national computerized welfare recipient index has been proposed by the newly organized National Welfare Fraud Association (NWFA).

The group has suggested that the Department of Health, Education and Welfare set up and administer a national data bank which could be linked to computer systems in all the states. The group is currently having talks with HEW, according to Richard Peterson, president of the NWFA, but the government agency has not indicated whether it would favor such a data bank.

(Source: published results of the automated personal data banks hearings by HEW could affect this decision.)

The purpose of such an index, Peterson said, would be to stop people from shopping around for welfare and to eliminate

# Democrats Set Up Guide to Safeguard Elections in '72

WASHINGTON, D.C. — The parties and party workers "remain the most important deterrent to fraud and the safeguarding of accurate elections," especially computer-based elections, according to a workbook passed out by the Democratic Party last year to help election observers detect possible fraud in the election process.

The document noted "there are consistent errors in the results" from punched-card elections even though there has never been a documented case of fraud or conviction which has led to criminal conviction.

It also noted that there may have been cases where the election results were changed by either intentional or unintentional errors which have never been caught because they could not be identified at a later date.

Noting that the ballot-counting procedures could sometimes be quite confusing, the document stated that "in this confusion, many errors may occur which are not detected, or there may be extraordinary opportunities for election fraud."

There is also a problem in ballot security.

## Vote Fraud Feared

(Continued from Page 1)

effective. He indicated that since it occurred late in the campaign (October) there was a fear that the programs that had been developed for vote counting had already been tampered with and that tampering could not be caught so late in the campaign.

The basic strategy of the last minute effort, according to Max Factor Jr., one of the men who helped coordinate the last minute briefing of state election officials, was to warn the people in the field of the possibilities of fraud and give them some basis with which to detect the possible fraud.

Basically, according to James Farmer, who conducted the briefing sessions for the party, the effort was aimed at deterring possible frauds by having "trained personnel who observe the process and hence indirectly pressure election officials to increase security measures and suggest to potential criminals that the chances of getting caught are markedly increased."

In addition, he said the training program used was aimed at documenting occurrences of vote tampering, so that possible action could be taken after the fact to apprehend and prosecute violators.

ity, the report showed, and recorded cases where ballots were misplaced.

To help control the possibility of ballot switching, the report recommended that all of the ballots be counted at the precinct and that the precinct then recon-

## What Did They Learn?

NEW YORK — James Farmer of Systems Research, Inc. will discuss some of the results of the Democratic Party monitoring activity in the vote-tampering area at a National Computer Conference session on "Computers in the Elective Process" scheduled for June 5.

He said this total with the number of ballots counted at the election center later.

Also, the ballots on punched cards should be checked carefully to make sure that write-in voters have not voted for too many people in any one category since the computer cannot detect the

write-in.

All punched card ballots should have the precinct number on them, the workbook said, because "if this is not done, it is possible to switch the ballots and the count error not be identifiable later."

Furthermore, "the computer programs which count the ballots or which perform a media conversion from the card to an image on magnetic tape or disk offer a high risk of inaccuracy," the workbook stated.

"Furthermore, there is an opportunity to 'rig' the ballot count which would be undetected by most logic and accuracy tests," the workbook stated, noting "these methods are well-known and documented."

To help prevent this, it said the source programs should be made available to computer specialists to check for any possible areas of fraud and for "code which is not used, used under special circumstances or which appears extraneous."

A listing of the object code of the compiled program should also be obtained for later checking with core dumps, it said.

"Frequently, the program used for counting the ballots is not the identical program used for the logic and accuracy tests or filed with the appropriate state agency... but it is imperative that the program used be identical to the official program; this is best determined by comparing the election night core dump to the source and object code listing," the workbook stated.

"On election day, observers should see the program initiated, a logic and accuracy test taken, and a core dump taken," for later comparison to make sure that the computer program used on election night is the valid one.

Even though "a logic and accuracy test of this size may take almost as much time as the election count itself... it is the only way to assure an accurate count," the document continued.

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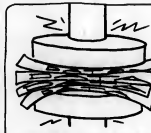
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## 'Honeymoon Is Over'

# Soviet Diagnoses State of Cybernetics Medicine

Novosti Press Agency

(Interview granted by

Professor A. Popov to V. Demidov:  
"We are on the Threshold of a New  
Age in Medicine")

About 10 years ago medical cybernetics had its honeymoon. They were talking and writing about diagnostic computers which would take but a split-second to diagnose the most difficult cases!

Science  
in the  
USSR

Years have passed, however, and even children have their encyclopedias of cybernetics — a book with fine pictures, but there does not seem to be much talk about diagnostic computers anymore. What can be the matter?

"Go to Kiev to satisfy your curiosity," my friends said. There is an Institute of Cybernetics there. See the laboratory of Professor Popov. He will tell you all about it."

So I came to Kiev. I saw the professor in a spic-and-span building of the institute on the outskirts of the city.

Q. Why isn't there any talk about diagnostic computers at present?

A. Because there aren't any.

Q. But just a few years ago...

A. A few years ago it all seemed much easier than it does now. We knew too little then. Because of that our understanding of the problem was somewhat primitive. Today, however, we have grown if not cleverer, then more experienced so that we are beginning to appreciate the gigantic scope of the problem we are out to solve.

Our research group is called the laboratory of medical information systems — information systems rather than diagnostic computers. The difference is by no means accidental for it comes not out of a desire to put it more scientifically, but the changing of one name for the other is

connected with the entire process of getting a clearer understanding of the problems involved.

What did we want before? We wanted the computer to diagnose a case on the basis of the distinguishing features of the disease. This kind of approach contained a gross error. It was like taking an instant picture, i.e., ascertaining the state of the patient at the moment of examination and using that for a final inference.

How could we forget that a disease is not the state of the organism at a given moment, that it does not come all of a sudden. The changes in the organism accumulate slowly, one added to another, and only then do they manifest themselves in some form.

It is an elementary thing. When a patient comes to see his doctor, the latter, above all, asks him about his past. Unless we know the past any treatment becomes absolutely senseless; it is as clear as ABC.

Next comes the examination: collecting information about what is happening to the organism now. It is only following this stage that a diagnosis is made and a certain treatment is prescribed. Later we observe the way the patient responds to the medicines and treatment prescribed, marking the progress of the changes. Accordingly, we make corrections in the diagnosis and the treatment.

It looks very complicated indeed to think that we wanted the computer to take over making a diagnosis which is but a tiny part of the process. What must be done is not merely making a diagnosis but giving a comprehensive treatment.

Q. Do you want the computer to take over the entire process?

A. Not exactly. The computer will not be entrusted with treating the patients, despite what the supporters of an all-round introduction of cybernetics into medicine may claim. To follow this kind

of reasoning we may come to a ridiculous assertion that medical men will get replaced by a kind of cash register: a patient comes up to the computer, pushes the button, the computer will give out a check for the drugs — you may go ahead and take whatever treatment is prescribed. To think along these lines will inevitably mean that doctoring as a field of scientific creative activity will come to an end.

What is the situation at present? About two decades ago the press raised the alarm: the doctor takes up too much time writing, whereas he has less and less time at the bedside of the patient. Have there been any changes since then? There is much more paperwork at present.

Our point of view is the computer is to take over all the paperwork — collecting information, storing it, keeping tabs on the patient's condition, making general-

(Continued on Page 7)

# A money-saving idea that IBM doesn't like to talk about.

It was probably someone at IBM who invented the term "mass memory" a decade or so ago to describe their tape drives, disc drives and drums. Maybe they were "mass" storage back then. But in light of today's data storage requirements, they really have to be considered "mini memories."

And as you've probably noticed as your storage requirement has grown, so have the costs of your growing stable of discs and tapes.

While IBM keeps on grinding out the

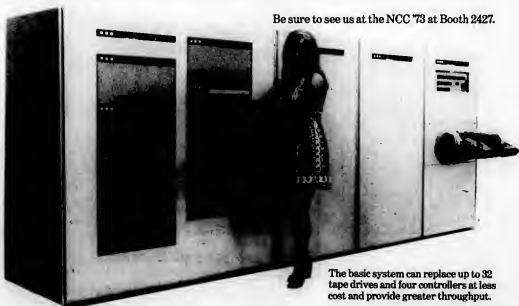
tapes and discs, we started thinking of ways to cut costs, cut down handling and put more data on-line in a real mass memory system.

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# Day of 'Aesculapian Computer' Still 10 Years Away

(Continued from Page 6)

ized data available at the request of out-patient hospitals, etc. In this way the doctor will get back the time he now spends on paperwork.

We shall give the doctor back his time to think about the information put out by the computer. Decision-making is the prerogative of the human being.

## Science in the USSR

Look at the way a doctor today makes the round of wards. He comes into the ward and comes to one patient after another like he did a hundred or three hundred years ago, keeping all relevant information in his head while later he tries to recall it and put it on paper. If, however, this information is collected and stored by the computer at the patient's bedside, there will be no loss of time or information and that alone will make the work of the doctor more efficient.

What is bad is that present-day computers cannot do anything like that. They can do computations involving the design of an aircraft wing, the missile trajectory or machine-tool control, but a human being is a far too sophisticated organism for them. I have in mind the computers of the "second generation" like, for instance, the Minsk-22 computer.

When computers of the third, fourth or, better still, fifth generations come into being — computers with a large memory store, fast action, capable of understanding everyday human words or, better still, speech — then all I've been talking about will become a reality.

Q. When will it be?

A. No sooner than in some 10 to 15 years' time.

Q. In the meantime, are we just to sit and wait?

A. Not at all. Do you think that if computers like that were available at present we would be able to use to the full all their potentialities? That would not be the case. They would simply go to waste as the doctors are not as yet prepared to handle them. The doctors cannot think

the way computers are accustomed to "thinking." They cannot communicate with the computers.

What does "communicating with the computer" mean? Above all it means being able to express oneself with precision and in no uncertain terms. However, if doctoring is an art then the terms it uses are most ambiguous, as is the case with any art. Take, for instance, myocardial infarction which has dozens of nuances for which we have no names so far. How can we carry on a dialog with the computer? The most important thing now, therefore, is to do preparatory work.

Q. In other words, you want to get doctors to think in a computer-like fashion before the computers are available.

A. Precisely. We are summarizing all the characteristics of the human condition into a system which can be easily put into the computer. On the other hand, these characteristics are arranged in the case history in a way which makes it more

convenient for the doctor to do conventional recording of the information.

Take, for instance, temperature. The case history has a special table complete with figures designating degrees with every other decimal marking. The only thing left to be done is to put a cross in the necessary square.

What are the advantages of this kind of formalized recording? In the first place, it tends to discipline thinking for nothing can be omitted or forgotten. Secondly, the essential recorded data becomes simpler, and assumes using the cybernetic parlance, the yes-no character.

What is most important, however, is that a "formalized" case history like that can be easily translated into a computer language and put into the memory store. A punch operator will be able to put it on punch cards without any additional instructions from the doctor.

A conventional case history does not lend itself to be punched for it has too many ambiguous and vague things. Talking about computerized diagnostics some 10 years ago, we somehow neglected this side of the problem, though there was talk about a data store which was to accumulate information about diseases and patients.

At present we are only approaching a new age in medicine. Our dreams have become more serious and we do not expect cybernetics to be a miraculous cure-all. What kind of cooperation will evolve between the doctor and the computer and what will it lead to are the problems facing us today.

## Boeing Studies Aircraft Noise

SEATTLE — The Boeing Co. will undertake a project for the Federal Aviation Administration to develop data necessary for identifying aircraft noise patterns in the vicinity of the airports.

During a six-month period, Boeing will collect and analyze existing noise and performance data on its four in-service commercial aircraft — the 707, 727, 737 and 747. Final data, to be presented to the FAA in computer program and graphic form, will identify the different aircraft performance and noise source characteristics.

"The computer programs and graphics will be valuable for the development of land use planning tools for areas near airports," FAA administrator Alexander P. Butterfield said. "The data will enable a more accurate delineation of noise patterns on the ground."

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## Editorial

### 99.9% Secure?

If computer systems cannot be made 100% secure, as suggested by a Navy Department official recently, managers of computer centers must resort to specific means to protect their data.

As suggested by Cmdr. Jan Prokop, users should spend their money where it will do the most good, depending on their individual situations. Such expenditures, it would appear, could be made by implementing effective security-clearance procedures and physical-access control systems, as well as by designing secure computers.

An investment must also be made in time, the time it takes to generate a security "attitude" among DP employees; an identification with corporate or company goals; and not simply the day-to-day operation of the DP center, is also important.

Prokop's comments come at a particularly significant time, in that IBM is expected to give its first annual report on its five-year, \$40 million security study, during the National Computer Conference next month.

### Vote System Troubles Show Auditing Need

Re: Peter Rijken's letter of April 11 and the Datavote programming system.

I wish to thank *Computerworld* for its editorial support of the need for computer auditing (April 11). This editorial apparently is the outgrowth of the article in which I discussed the insecure features of the Datavote vote tally system [CW, March 7].

We are pleased that CW had the wisdom to expand the problem to all data processing systems. This is an honest admission that computer systems are fallible and are subject to human mistakes and/or fraud.

Our particular experience with Datavote only confirms the need for computer audits. Rijken's letter correctly stated that Honolulu City and County employees aided state employees during elections, but he neglected to mention that Honolulu computer center employees are the only people in Hawaii who know how to operate the Datavote vote-tally system.

Unfortunately, knowing how to work with a system and understanding the program logic are not the same thing. Even though we have access to the source cards, the program logic is a complete mystery to everybody in Hawaii.

The problem with the Datavote system (and any other vote-tally system that I am aware of) is that there is no provision for feedback to indicate it is operating correctly.

Since feedback is missing, I cannot conceive of any technique except an audit to assure the voters that the program can perform properly. Even an audit cannot guarantee an error-free election process, but at least there is an attempt to determine if program errors or fraud are present.

The "elaborate testing procedures" and "logic card accuracy tests" hardly qualify as feedback. All they prove is the system worked as advertised (not necessarily properly) during the

test periods. Appealing to the League of Women Voters, the Bar Association and the press as authorities on the accuracy of a data processing system is ludicrous.

This appeal to authority may be appropriate for a Madison Avenue advertising agency, but Datavote is concerned with the accuracy of a most important part of the democratic process. That is hardly in the same category as selling soap or toothpaste.

I do not understand why Rijken believes unqualified acceptance of his system is so important. The editorial summarizes the whole situation: "Data processing system vendors... should welcome those who are prepared to assist in auditing and even in financing the audit."

If Datavote is accurate, Rijken has nothing to fear from an audit and Datavote would become more marketable. He should be lending support to what appears to me to be a common cause.

Gerald L. Mann Jr.  
Director of Data Systems  
City and County of Honolulu  
Honolulu, Hawaii

### RPG Affair Centers

#### On Documentation

I would like to discuss what I believe is the key issue in this RPG vs. Cobol controversy. This is the question of documentation.

There are three main kinds of program documentation: system, operator and program logic documentation, each with a specific purpose. System documentation describes the objectives of the system and the flow of files and programs. Clearly, this is fairly language-independent.

Operator documentation tells how to run the programs. Except for mounting instructions, all RPG programs have consistent operating procedures and halts which are written up by professional technical writers in the manufacturers' manuals. In comparison, few Cobol programmers do more than program

and describe dead-end halts. They can hardly devote the time to thinking through and documenting the detailed recovery procedures that we expect. Furthermore, few operators will spend much time trying out the generally untested bypasses an individual Cobol programmer might provide.

Finally, we come to program logic documentation. The main use of this material is the modification of existing programs, particularly by different programmers.

Here I feel that a programmer experienced in either language will find the actual code, which describes what the program actually does now, is more useful than English language comments, which describe what someone thought the program did when the comments were written.

Both languages provide a comment facility using an asterisk in a certain column. But the Cobol programmer must document Mickey-Mouse functions such as file merging, end-of-file correlation and sequence checking which the RPG programmer can find fully, professionally and consistently documented in the standard manuals.

Similarly, the RPG maintenance programmer can take these functions for granted, and concentrate on the unique functions of each individual program.

To the extent that professionalism, in program documentation consists of meeting the present and future needs of one's organization in an efficient and expeditious manner, RPG is as professional a language as any, and perhaps more so than some.

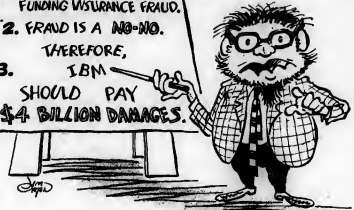
Michael Gershman  
The Singer Co.  
Ozone Park, N.Y.

### Consumer Protection

Re: "No Credit Here" [CW, April 25].

As the owner-manager of both a credit bureau and a DP bureau, I feel the editorial indicates a complete lack of knowledge of consumers, credit bureau, creditors and their mutual relationships.

1. AN IBM COMPUTER  
WAS USED-WITHOUT  
WARNING-IN THE EQUITY  
FUNDING INSURANCE FRAUD.  
2. FRAUD IS A NO-NO.  
THEREFORE,  
3. IBM  
SHOULD PAY  
\$4 BILLION DAMAGES.



"What Do You Mean, You Don't Understand That Last Step?"

## Letters to the Editor

In the guise of consumer protection *Computerworld* has gone off "half cocked," armed with little knowledge and few facts, endorsing, nay, pushing for a stronger "Fair Credit Reporting Act."

Credit is not yet a right guaranteed by the Constitution. It is a privilege. To link consumer rights and credit shows a lack of understanding.

Credit bureaus do not issue "credit ratings." They do record facts, public records, creditor ledger information and assemble these in a factual credit report. The consumer makes the credit record, not the credit bureau.

The cost of credit is borne by the consumer. Therefore, to issue credit wisely and keep the costs of credit at a minimum is fundamentally the finest form of consumer protection.

Richard L. Vennell  
Park Ridge, Ill.

### The Buffered Way...

In reply to the article on the advantages of a key-disk system over keypunches [CW, April 11], there are some common misconceptions concerning cost reductions which will result by replacing keypunches with a key-disk system. I cannot agree that key-disk will result in greater keystroke/hr. I cannot agree, in fact, that any increase in keystroke/hr will be the result if you replace buffered keypunches with a key-disk system.

Inasmuch as the elemental times required to keypunch are the same on both types of equipment, the keystroke/hr will not be affected.

The major difficulty, as I see it, is that these articles generally fail to stress the difference between the purely mechanical keypunches of the past and the new buffered keypunches widely in use today. The use of electronic memories in the buffered keypunches (as in the key-disk systems) increases productivity rates equally.

Reformatting as a source of savings is also mentioned in the article. In my opinion, reformatting for the reduction of duplicate data in multi-card records has ceased to be considered

a real savings with the advent of electronic memories and their nearly immeasurable processing speeds.

When discussing increased keystroke/hr, it might be well to remember that the real dynamic advance in productivity came about with the introduction of the electronic memories which generally increased throughput by some 20%.

Increased productivity today is the result of a systems approach to data preparation and the selection of reliable equipment to best implement that system.

John F. McCarty  
Vice-President, Marketing  
Peripherals Systems, Inc.  
Norristown, Pa.

### Kepp "Safe Approach"

The April 25 editorial discussed the use of formats other than 80 columns. As a manufacturer of CRT terminals, we have made extensive studies of the normal applications of operator to computer interfaces.

For reference data, the computer user would like all of the information in the system available to him at the rate he can move his eyes. For new information being presented, reading is most rapid with relatively narrow columns (witness newspapers of 30 to 40 characters in 1-1/2 inch to 2-1/2 inch widths). For hardware efficiency, binary numbers are decidedly better, so the most desirable character count would be 32, 64 or 128. We have followed the newspaper lead and gone to 32 characters, reducing the tube size and the overall weight and size of the system at the same time. Interestingly, almost every CRT display manufacturer started with less than 80 characters on a line (typically 40) and was forced to go to 80 "because that's what we're used to."

Don't "discard the safe approach"; simply decide what is needed for the application!

Byron M. Cole  
Vice-President  
Car-Mel Electronics, Inc.  
Los Angeles  
[Other letters and viewpoints on Pages 9-11]



# Data Collection Systems Are Not Always Proper Tool for Control

A few years ago, the State of Ohio put in a series of Wide Area Telephone lines (Wats). The lines concerned have been greatly overused, and, owing to design of the telephone system, this overuse has resulted in large parts of a complete telephone company station being dedicated to handling these calls.

A solution to this, scheduled to go into effect in September, will probably reduce the number of calls attempted through the network by 40%. However, this solution does involve the collection of a considerable amount of data, and therefore relies to some extent upon the known human objection to being crossexamined unnecessarily. The data mainly comes from those who are now using the system correctly.)

The data processing professional's questions then are:

- Is the State of Ohio's solution to its telephone load problem a professionally acceptable piece of data processing?
- Is it the best solution available?

## Reduced Collection Alternatives

Taking the second question first, there are a number of alternative methods available. The amount of data to be collected is unnecessarily high. There is, for instance, no real reason for Ohio to collect from-and-to data on any calls made while a system is not being overloaded.

There is some reason to collect identification data on calls being made while the system is overloaded. Even so, it is unnecessary to take a 100% from-and-to census; an adequate sample which will allow the identification of those people who are abusing the privilege is all that's needed. Another alternative to the proposed Ohio data collection system is for the

phone company to work for the proper timing of calls.

For instance, assume there were three types of calls. Let us say that one meant there was a line available and you could expect to get your call through. A slightly higher dial tone could be used when the loading on the system was such that a user would have to dial at least three times before getting through. That would move some demand from the overload period. After all, people do not like to waste time unnecessarily, and will tend to make calls at a time when they can get straight through.

Then suppose there was a third level that indicated that on an average you could expect to dial eight times before you got your line.

Even without any collection of data, the prospect of having to dial eight times would deter many callers, even diverting urgent calls to other available communication methods. It would assist in the smoothing of the loads.

## Improved Information Exchange

Another way of reducing loads without involving data collection is to start shortening telephone calls.

Many firms shorten telephone calls. This persuades people to increase the density of information transmitted per minute.

The situation now is that all these alternatives—reduced data collection, reduced load systems and reduced call duration—have been passed up by Ohio in favor of a "Big Brother" data collection system, apparently without even trying the other methods.

Big Brother data collection, where data is collected on all other unknown reasons or reasons which are basically inadequate and distributed to unknown people, makes this system a form of a threat. It acts in the same way a random police search system does. I do not believe thinking DP people want to get into it until it has been shown to be unavoidable.



**The Taylor Report**  
By  
**Alan Taylor, COP**

# Questionnaire on Data Collection Systems

1. Do you believe unnecessary data collection should be avoided?

( ) Yes ( ) No

Comment \_\_\_\_\_

2. Do you believe the institution of a data collection system as a control device, without testing available non-data collection control systems, is unprofessional?

( ) Yes ( ) No

Comment \_\_\_\_\_

3. Do you believe professional data processing education should teach alternatives to data collection and the disadvantages of using data collection as a control system?

( ) Yes ( ) No

Comment \_\_\_\_\_

4. Do you believe professional data collection education should do likewise?

( ) Yes ( ) No

Comment \_\_\_\_\_

Name \_\_\_\_\_ Professional Position \_\_\_\_\_

Organization \_\_\_\_\_ Address \_\_\_\_\_

Society Membership \_\_\_\_\_

After completion, please return to Alan Taylor, c/o The Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.

Under these circumstances I feel the State of Ohio should, even now, change its plans. As long as a person making the telephone call does not know that the system is overloaded and is not even given the opportunity to know this, I do not see how any case can be made for any data collection operation—and certainly not the one currently planned.

This is not to say I am blaming the people who have designed the system. I do not expect anyone has ever asked for (or considered) the alternative method. I do not expect them to realize that data collection is not the only way of information control. I do not expect computer people have even considered the possibility of reducing the loop-time involved between the commissioning of a piece of unfortunate behavior (such as calling over an overloaded system) as being any part

of a data processing situation or evaluation.

And I do not really blame the people who have failed to teach them these elements of professional data processing. They have given the courses on "how to," not on "when to."

But I do expect that now the data processing profession is growing up and is able to use data processing selectively so that the professional disadvantages of data collection, as well as its advantages, will be included both in data processing courses and in data processing decisions. At least they will any time that they want to call themselves professionals.

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# Letters to the Editor

## Which Language Is Best For Your Environment?

Although I do not completely disagree with Marvin S. Ruth's letter concerning RPG or RPG-II (CW, March 28), I believe the language deserves some positive support. Perhaps in a large shop where a staff of three or more programmers is required and on-line systems are installed or in a sophisticated multiprogramming environment, RPG or RPG II may not provide the flexibility or power required.

There must be recognized that RPG is the acronym for "Report Program Generator." When one tries to use the language in such a way as to require additional program runs to perform a given task, perhaps the job should be written in another language.

We have found through proper system design, using a mix of Cobol programs and RPG II programs (creating simple sequential input to a series of RPG programs to process reports), the language has been quite adequate.

It is tremendous to have an extremely efficient program, but ask yourself, How efficient is the average Cobol program? How much time was spent compiling and debugging?

When a person is proficient in the language, an RPG program to process a fairly complex report can be written, keypunched and operational in one day. As far as documentation is concerned, lack of adequate documentation is a management problem more than a language problem.

The question is what languages are best for your shop or environment. When management needs a report, it really

doesn't care what language it's written in. It needs the data to run the company and make decisions based upon the data.

Anthony B. Buscaglia  
Director of DP  
Niagara Frontier Services  
Buffalo, N.Y.

## Both Have Advantages Based on User Applications

Both RPG and Cobol have their distinct strengths and disadvantages. And upon the user applications and systems hardware involved. For those who feel RPG II is a limited language, merely a step beyond sort and tab, I suggest they read recent texts and manuals, and objectively evaluate the capabilities of RPG. They will discover a versatile language, capable of solving all commercial applications and limited only to the imagination and ability of the programmer.

With few exceptions, all the elements of Cobol are available to the RPG II user through tables, arrays, exits to subroutines, etc.

To those who tout RPG as the panacea of the data processing industry, I also suggest they read and objectively evaluate current texts and manuals concerning Cobol. Cobol is truly a home on the large system with high volume files, an area where RPG can provide little competition.

Each language has advantages within the operating environment in which it is utilized. Perhaps one day, in the not too distant future, the unique advantages of both Cobol and RPG can be combined to create a new language which will com-

pletely fulfill our needs as programmers and end this debate of RPG vs. Cobol.

Fredrick W. VonKutleben  
Arthur J. Gallagher & Co.  
Chicago, Ill.

## Give Programmer the Option

As the Cobol-RPG controversy goes on, the RPG enthusiasts claim great labor savings in programming with minimal sacrifice of efficiency, and intimate that Cobol programmers are so enamored with their language and designs that they are expending more labor than necessary to obtain reasonably efficient programs.

The Cobol supporters, on the other hand, claim Cobol offers more flexibility in system design as well as more efficiency in program execution and suggest that those who program in RPG are perhaps not competent enough to use Cobol. In our shop, where most of those programming have the option to use either language, we find that both sides have their merits. RPG is usually used where speed of programming is critical and efficiency of operation is only of secondary importance. Special requests and annual reports fall into this category. Cobol is used for heavily used programs and in critical systems.

Joe Scanlan  
Providence, R.I.

## Use One With Fast Results

Re: Marvin S. Ruth's (CW, March 28) and Norman F. Allen's (CW, April 25) letters complaining of the horrors of RPG and RPG II.

Ruth has completely overlooked what RPG was designed for—report genera-

tion! I am really sorry that he cannot do on-line systems work with RPG II, but you can't haul concrete in a Cadillac either.

Allen states in his 11-year career, he has never seen an installation that wasn't an operational nightmare.

My experience covers 23 years, doing everything from running a sorter to directing the DP function. Once IBM dropped the 1401 RPG and came out with 360 RPG, the programming area started changing. Programs needed today were ready today. I speak not only of quick print jobs, but also complex data manipulation.

When a crisis arises, I want results now, not next week or a month from now. When management wants an answer, it wants it now, and we deliver, but we keep an open mind. If we can get the answer in a hurry with Cobol, we use it. But in most cases we have to rely on RPG or RPG II. My shop is approximately 90% RPG/RPG II and it runs very smoothly.

P. Robbins  
Director of Operations  
NMU Pension & Welfare Plan  
New York, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

# Blame Weak RPG Shop on People, Not the Language

By Charles T. Pritchard

Special to Computerworld

I have remained silent just as long as I can concerning the series of RPG vs. Cobol letters that have been running in *Computerworld*. In their haste to make their ideas known, previous writers have displayed the three characteristics which so often cause the data processing staff of

pany put on his list. Regardless of what his skills are, I don't need an employee with his attitude.

## Remember When?

It is obvious to a good RPG programmer that the Cobol enthusiasts have not seen an RPG manual since the days of the 1401. (Yes, Virginia, there was RPG for the 1401. It wasn't very good, but it was there.)

Any resemblances between 1401 RPG and RPG II are purely coincidental. The RPG man, in turn, defends his language by offering coding tips and debugging aids. Those things belong in classrooms—not in Letters to the Editor.

Another writer saw a relationship between coding in RPG and poor run books. Poor run books are caused by poor management. Definition of programming, documentation and operations standards is a management function. I fail to see how weak management can be blamed on RPG.

Cobol programmers throw a few crumbs

to RPG programmers by conceding there are probably a few applications somewhere that might be better written in RPG. I suggest the reverse.

## RPG for All

Virtually all commercial applications could be better written in RPG if only there were enough good RPG programmers available. Unfortunately, good programmers move upward in management. Most firms, however, would rather have an application (even an RPG application) written by a good Cobol programmer

rather than by a weak RPG programmer.

Management wants a certain job done by its data processing (or any other) staff in the most prestigious manner at the lowest cost and in the quickest time possible. Failure to meet these requirements is a people problem, not a language problem.

If you have seen a weak RPG shop, blame the people, not the language. If you have seen (or have) a strong Cobol shop, credit the people, not the language.

*Pritchard is data processing manager with Baker-Crow Co., Dallas.*

## Viewpoint

an organization to be thought of as not very professional:

- They like to call names and make cute but degrading statements.

- They are grossly ignorant of instruction sets, compiler features, coding techniques, etc. of any language other than the one they prefer.

- They miss the point.

One person said, "Add that company to my list of places not to send my resume." May I respectfully ask to have my com-

## Letters to the Editor

### 'Damn the Name... But Give Me the Shirts!'

Having read the many letters to the editor as well as Alan Taylor's article (CW, May 2) regarding what to do with

Robert D'Unger's name, I have concluded that this issue has been whipped to death—or nearly so.

For most of my life I have experienced a similar problem, although I must admit it has become more prominent since the advent of data processing. In all fairness, however, the problem is not solely related to data processing.

Many clerks and a great many typists over the years have had difficulty with my name. The apostrophe is omitted, "B" is not capitalized, and I am sure you can imagine the variations in spelling.

Since data processing came into being, I have not had a single paycheck or computerized bill with my name correctly shown. Even stock certificates are wrong!

However, none of this really disturbs me. Nor am I disturbed when I call for my laundry and the clerk finally locates it in the "B's" instead of the "O's."

What this all amounts to is that I am not at all touchy about the spelling of my name. I have never had any trouble cashing a paycheck or stock certificate. I couldn't care less about where a data processing system files my name.

All I really want is for them to be able to locate my account when the need arises, and I want the laundry to "locate the damn shirts" when I call for them! Nothing else really matters.

Joe O'Bryant

Hartdale, N.Y.

### Sound Auditing Need Shown

Re: Equity Funding: the computer side of what happened appears to be emerging. Lacking was the independent ability to access, verify and confirm the validity of all records.

Hundreds of users of computer auditing systems that equip the auditor with an independent "telescope" into computer files will disagree with the auditors... "professing that it is virtually impossible... to detect the kind of fraud that appears..."

I believe the ratio of fraud to innocent mistakes will inherently be tiny. The deterrent effect of good computer auditing through the computer makes it even smaller.

General information to date indicates the Equity Funding situation, while perhaps ingenious in application, involved the computer in a fairly simple manner. If the computer people sensed something wrong, users of a sound auditing system should have and would have verified the computer files even earlier.

Jerome Priest  
President

Computer Resources Corp.  
Wilton, Conn.

### Individual Determines

The dialogue on RPG reminds me of the Block/Head debates on the checklessness society (1966, 1967).

What is shown by this is that data processing is far from a science and that successful use of computers is an individual thing.

To this I add, management take note.  
K.A. Kleinman  
Systems Manager  
Edison, N.J.

## During

The June 6th Show Issue (B & W close May 25th.)

## After

Our June 13th Wrap-up Issue (B & W close June 1st. Color Close May 25th)

Whether or not you're going to The National Computer Conference, *Computerworld's* last-minute, complete coverage of the new, consolidated show is must reading—including the latest information on the wide variety of new products which will be displayed. Only a weekly newspaper can give you such complete and up-to-date coverage. And *Computerworld* is the only newsweekly for the computer community.



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## Read Journal of Development

## Involve Users in Cobol Process? Educate Them First

By Fred L. Forman

Special to Computerworld

Christopher Coddington's "Viewpoint" ("Contact Between PLC, User Lacking," CW, May 2) strikes me as a curious attempt to refute points in my previous "Viewpoint" ("Make Suggestions Direct to PLC," CW, April 11).

First, my motive was not to discredit Alan Taylor, but to discredit his "solution" to a problem.

I agree with Coddington that the problem is user involvement in Cobol development, and I do not believe that Taylor has proposed an acceptable solution. What is curious about Coddington's article is that he also fails to suggest a solution.

Taylor's solution to the problem of user involvement is that users send proposals to the Cobol Coordinating Committee which will review, recommend, wait for response, then "take action" (whatever that means). Coddington seems to agree with me that such a committee could only delay the user from getting his requests acted upon by the Programming Language Committee (PLC).

Is 3C an effective mechanism for providing users with timely information about Cobol development? I think not. I said in my article, and still believe, that Taylor's solution will only give users the opinion of a very narrow segment of the user society (the 3C Research Department).

## Educate Users

To involve users in Cobol development, we must educate users to the development process, provide a mechanism for suggested development and report what development has taken place. PLC accomplishes the last two items, but has failed in the first—educating the user community.

My previous "Viewpoint" provided information to the user so he would know

how to become involved. Alan Taylor is not serving the useful involvement of the user by setting up new committees and journals.

Neither has Coddington in any way

## Viewpoint

contributed to the solution of user involvement with his article.

The best way for the user to become involved is to get a copy of the Codasyl Cobol Journal of Development (Publication 110-GP-1c) by sending \$3.50 (payable to "Receiver General of Canada") to: Technical Services Branch, Department of Supply and Services, Fifth Floor, 88 Metcalfe St., Ottawa, Ontario, Canada, (K1A 0S5).

Suggested proposals, ideas and thoughts may then be made directly to PLC by

sending them to: Chairman, PLC, Box 124, Monroeville, Pa. 15146.

## On Representation

As a final observation, Coddington fails to note the concept of representation. PLC, Ansi and the other committees to which he refers are representative of the user. There is no practical way to have all the users participate in every decision.

Applied to government, industry, unions and nearly every other segment of our lives, the concept of representation works well, so long as the people who are represented are properly informed about decisions that have been made on their behalf and a mechanism for change exists.

PLC informs the users it represents by making the JOD available to the public. PLC also provides a mechanism for change to the extent possible (yet still able to accomplish useful work). The user is solicited when practical—for ex-

ample, the public availability of the Data Base Language Task Group proposal, and inviting proposers to the meetings at which its proposal is considered.

Ansi and Ecma are also representations of the users but are non-PLC organizations. I'm not sure why Coddington calls them "affiliated." They are affiliated only in the sense that they also are interested in the Cobol language. They use the same channels which are available to anybody for submitting proposed changes to the language.

Neither Alan Taylor nor Christopher Coddington has solved the problem of user involvement in Cobol development. Nor have I fully solved the problem. I have, however, tried to provide the information which the user needs to become involved in Cobol development.

Forman currently represents American Management Systems, Inc. on the Programming Language Committee.

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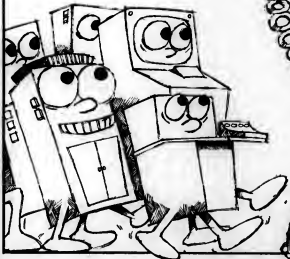
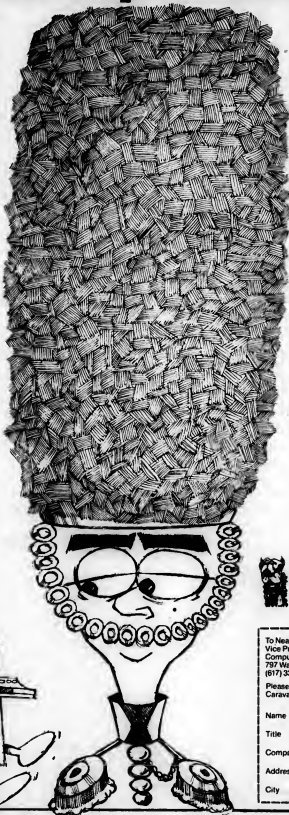
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# SOFTWARE & SERVICES

**Saves Time, Forms Costs**

## 'Recop' Lists Reports and Recipients

By Don Leavitt

BEVERLY HILLS, Calif. — The Report Control Optimizer (Recop) program, just introduced by International Management Systems, provides management with a means of identifying obsolete, unnecessary and unwanted reports. From 5% to 20% of all reports may fall in one or more of those categories, the company said.

Though intended as a tool to review existing practices, Recop may also prove useful in answering requests for apparently new reports that may already be in production, but not being delivered to the current requestor, perhaps through an oversight. Or it could be used to identify a current report that needs only slight modification to fit a new and broader requirement.

### Hidden Benefits

Controlling report distribution may save computer and staff time, but its most important benefit might well be in the area of eliminating both multiple-copy, or specially printed forms. More abstractly, the Recop lists may provide the end-user departments with a clear indication of the DP staff's continuing interest in their problems.

Operated in batch mode on any 360/370 with a 55K-byte partition, two tape drives and a 2314 or better disk, Recop includes two basic data files. One carries complete narrative and statistical descriptions (including identifying code numbers) of all reports to be controlled by the system. The other file contains installed information about the recipients of the reports.

The distribution definition file shows who gets each report, how many copies and both where and how they are sent to the recipient. Summary information includes the total number of copies of each report and the total or average number of pages produced. This data allows analysis, at the management level, of who is using

each report and why, and whether the distribution pattern is as effective as it might be.

### Report Checklist

Another Recop printout provides the DP operations staff with a hard-copy checklist of what reports should be generated by the various applications and to whom they should be sent.

Alternatively, each apparent recipient can receive a list of the reports he should be getting, together with a description of what each is supposed to cover.

Up-to-date maintenance of the Recop file is critical to the effectiveness of the system, and probably should be an assigned duty of a specific member of the DP operations staff, one who has to coordinate his efforts with the systems group and the end users, the vendor suggested.

Recop is written in ANS Cobol, but only object code is distributed. The program runs under either DOS or OS environments, and is available for a one-time charge of \$5,200.

International Management Systems is at 9665 Wilshire Blvd., 90212.

## 'Bars' Puts Boolean Retrievals On HP 2000 Systems, Leasco Net

HONOLULU — Users of Hewlett-Packard 2000 Series time-sharing systems and subscribers to Leasco Response 1 can now perform on-line retrievals of items from data bases through the Boolean Attribute Based Retrieval System (Bars) from Real-Share, Inc.

Search key parameters under Bars are built under desired field descriptors and Boolean connections (AND, OR) and negative variants of those connectors. The descriptive terms are stored in a keyword dictionary with a potential capacity, according to Real-Share, of "several hundred thousand terms."

Through ANDING and ORING of the terms, Bars searches are tailored to provide very precise retrievals. But the system recognizes that initial search definitions may be too general to be effective, so it reacts first by searching the file for matching items, reporting the number of "hits" to the user, and asking if the request is to be modified.

Once the user is satisfied with the form of his request, he may ask for a display of the items retrieved. These displays may be formatted in various user-defined re-

ports, from brief listings of relevant information from each of the items, to complete printouts of specific records.

Once the items to be retrieved have been identified, the user may invoke a sort routine to display all or a selected subset of the pertinent items in a particular sequence, perhaps based on a keyword that is irrelevant to the normal file sequence in which the record is stored.

Items can be stored under Bars in a variety of forms ranging from seven to 1,750 characters each. Items can be added, changed or deleted through the maintenance transactions. New items are associated with keyword dictionary terms either by the user, or by the system itself when copy is made of the relationship.

Bars is written in Basic and programs range from 10K to 11K words of memory depending on the computer being used.

The package can be purchased for \$19,000 or leased for \$790/mo (for two years) or \$645/mo (for three years). The Leasco Response 1 version is available through arrangements with vendors of that service.

Real-Share is at P.O. Box 275, 96809.

## Random Notes

### IMSL Releases Third Edition Of Mathematical Subroutines

HOUSTON — International Mathematical and Statistical Libraries, Inc. (IMSL) has announced the release of Edition 3 of its mathematical and statistical program library. This release, for IBM users, will be delivered to subscribers in July. Re-leases for other CPUs will be delivered later in the year.

The library includes subroutines and complete application programs written in Fortran and distributed in source code. A subscription price of \$840/yr includes updates, a facility for requesting additional subroutines and telephone consultation on the use of the library. IMSL is at Suite 510, 6200 Hillcroft, 77036.

### Andco 'Optima-Maxima' Service Provides Project Plan, Control

BUFFALO, N.Y. — Project managers can plan, control and later review operations through the Optima-Maxima service now available on a mail-in/carry-in basis from Andco, Inc.

The system generates a report on the various ways in which manpower and materials can be allocated to the project. During construction, the service provides progress reports, showing actual vs. expected completion of the various tasks within the project. Finally, a summary of the project elements is generated to aid in future planning.

Andco declined to estimate the cost of using Optima-Maxima, since every project is made up of many variables. The company is at 51 Anderson Road, 14225.

### Sisco Opens Remote Office

SAN FRANCISCO — A remote terminal facility at 215 Market St., opened recently by Singer Information Services Co. (Sisco), allows users to communicate directly with an IBM 370/155 in Sunnyvale, through Singer Systems Ten CPUs. Wybur interactive terminals are also available, a Sisco source added.

A full range of applications has already been installed on the IBM mainframe but the system also allows users to develop their own programs in any of the languages supported by the 370. Sisco expects to open other remote facilities, in Los Angeles and other cities, the spokesman said from 1105 Kern Ave., in Sunnyvale, Calif., 94086.

### Correction

The Naval Air Development Center at Warminster, Pa., is refusing all requests for copies of a CDC-6600-oriented General Purpose Simulation Program (GPSS) (CW, March 7). The program was created for the center's use, a spokesman explained, and there are no current plans for public distribution of the software.

## Time-for-Sale Now Includes 370s

ELMSFORD, N.Y. — Computer time-for-sale now includes a growing number of 370 installations throughout the country. This in turn has made many 360 time sellers more competitive, but by providing improved service rather than price cutting, according to Time Brokers, Inc. (TBI).

Time on 370/135 has become "much more plentiful" during the past several months, the firm said, and 145 time has been available for over a year in good quantity in all sections of the country. Outside 155 and 165 time is utilized on a regular basis by many large shops, TBI's latest report noted.

Demand for 360/30 45K time remains good in most areas, and this competition "is coming," TBI's offering. Requests for Model 49 time are now holding steady, but demand for time on 50s and 65s fluctuates, based both on competing 370 time available and the sporadic use requirements of some big system customers, the firm continued.

Traditionally, outside time-for-sale has been used by installa-

tions that are unable, for several reasons, to use their own equipment. Program development before in-house equipment is installed is one classic reason; periodic special jobs too large for the user's own gear or reporting period workloads too large for the equipment has tended to be the other major "excuse" for going "outside."

But TBI pointed out that a great deal of emphasis is being placed on long-term production contracts. Testing for new projects "always continues," the firm noted, but many users now prefer to purchase computer time for production, while utilizing their own computer to test new work.

Peripherals and add-ons from both mainframe vendors and independents has made the time-for-sale market complicated for both the buyer and seller of time.

TBI has prepared a free Uniform Code for Computer Time Marketing which is available from 500 Executive Blvd., 10523.

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## 'How Much Should I Buy?'

**BLUE BELL, Pa.**—Developed originally for the distribution industry, the Optimum software package, just introduced by Univac, enables purchasing agents to determine the "correct" quantity of an item to buy ahead of announced or anticipated price increases. It can be used on-line or in batch mode.

The system logic considers all factors, including cost of capital and storage as well as the actual cost of the items being bought. It calculates and then displays, on a CRT terminal or printer, the "buy-in" quantity that would maximize savings compared with paying a higher price later.

Savings to be realized from the proposed purchase are expressed in dollars and cents and as a percent of annual costs or other expenses. If the purchasing agent rejects the original recommendation, Optimum provides alternate analyses of other quantities with corresponding changes in the savings to be realized.

With this ability to check out different solutions to a given problem, Optimum gives the purchasing agent working on-line the same sort of "what if" options that modeling systems provide the financial analyst.

The system can be used, for example, to try to anticipate what should be done in case a critical item goes up in cost, even though no specific increase has been announced.

Optimum can be installed on "any" Univac system that supports a Fortran IV compiler, including the upper end of the 9000 Series as well as the 1100s. The software is free to Univac users.

## 'Regular' RPG Programs With BAL Help Keep 370 Moving at Stackpole Carbon

**ST. MARYS, Pa.**—Stackpole Carbon Co. has replaced its 360/30 with a 370/135 and is beginning to get into telecommunications to tie its six plants together, but DP director Dave Doyle has no plans to replace RPG with RPG II or any other language as his principal programming tool.

The company has a wide range of conventional, accounting-oriented applications all originally coded in RPG, but it utilizes BAL, Fortran or Cobol subroutines when they seem necessary. Sometimes regular RPG just isn't powerful enough, Doyle admitted.

### No Need to Switch

"We've looked at RPG II and are convinced it is much better [than RPG], but we really don't see any justification in it for us," he added. His installation is running 18 hours a day, five days a week, but the company owns the hardware so there is no real dollar saving to be gained by cutting computer time through RPG II, according to Doyle.

Future savings would be absorbed by staff time spent in whatever modifications are needed.

to go to RPG II, and by the ongoing cost of the more modern language system, which is an IBM program product. "Regular" RPG was released prior to IBM's unbundling of software in 1969 and therefore is free.

### 'Heaven on Earth'

Doyle's staff backs his continued use of RPG.

"If one has a good command of the RPG language and realizes the extra power it can have by combining it with BAL when needed, he can have the best of both worlds—[programs] that are easy to write and . . . capable of almost any application," according to John Mastrogiacomo, one of eight system programmers at Stackpole.

The staff has developed its own "package" of BAL subroutines to handle programming chores such as console input control, bit checking and physical disk reading, which can't be easily done directly in RPG, he added.

He feels sure that writing and debugging a program are quicker, and execution is slower with

RPG than with Cobol or BAL, but neither he nor Doyle has run benchmarks to prove these points.

As satisfied as the staff may be with the RPG capabilities, however, it is willing to consider commercial packages when they seem worthwhile.

In planning for telecommunications within its local complex and with its outside plants, Stackpole looked first at IBM's Customer Information Control System (CICS) but rejected it in favor of a TP monitor system from Westinghouse Tele-Computer Systems Corp.

The local version of the monitor is currently being tested and installed. The remote version, expected to tie into plants in Virginia and North Carolina first, is still under development, a Westinghouse source indicated. Stackpole will be using IBM 2780 and 3735 terminals, Doyle noted.

## 'In-Form Gives 804 Remote Capabilities

**NASHUA, N.H.**—Sanders 804 terminal users can capture data locally, perform extensive editing of the data and support remote communications to an IBM 360/370 mainframe by utilizing the In-Form software from Sanders Data Systems, Inc.

In-Form's logic permits setting up record formats, including both fixed and variable data, and storing these formats on one of the tape units within a cassette that is part of the terminal. The formats are described in English-like terms, including names for the fields, acceptable lengths and appropriate data types.

Editing on the 804 under In-Form checks input data against the specified stored formats before putting the record on the second tape unit on the cassette drive. In-Form includes the ability to store a partially completed record, then recall it to fill in data that had been unavailable when the original entry was made.

Remote batch communications support under In-Form transmits the collected data to a remote 360 or 370 and receives data and reports from the mainframe, storing the new input on cassette or putting it out on the terminal's printer. Both transmission and receipt of data, including the printing, can be done in unattended mode, Sanders noted.

In-Form uses the same line discipline as the IBM 2780 Remote Job Entry terminal, which makes it compatible with Btem, Qtam- or Tcam-based applications programs within the 360 or 370.

In-Form software is distributed free to users of the Sanders 804, which can be leased for \$401 to \$478 per month (depending on the lease agreement), or purchased for \$12,780.

Sanders Data Systems is on Daniel Webster Hwy. South, 03060.

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## Data Briefs

### RCA Teleprinters, Modems

#### Connect to TWU TXN Net

CERRY HILL, N.J.—RCA has a variety of leased Teletype teleprinters and modems for connection into the Western Union TWX network.

Under Western Union's interconnection policy, users of the company's teleprinter, Telex and TWX exchange services may own, rent or lease their own terminal equipment.

RCA will be leasing Models 3 and 35 ASR or KSR equipment.

Prices for the ASR Teletype equipment will start at \$77/mo, the KSR at \$63/mo. Delivery is within three weeks after receipt of an order. The lease/service contracts are offered on a 30-day cancellation basis.

RCA will also lease Model 32 ASR and Model 28 ASR or KSR terminal equipment to Telex subscribers starting early this summer.

RCA Service Co. is at Bldg. 204-2, 08101.

#### Terminal Replaces IBM 2741

SUNNYVALE, Calif.—Trendata is offering its Model 900 desk-top conversational terminal to work as a replacement for the IBM 2741 terminal and as a standard Selectric typewriter when not in the terminal mode.

The Model 900 consists of a heavy-duty IBM Selectric connected by cable to a small electronics/modem package that the manufacturer said can be located adjacent to the desk area.

Leased price of the Model 900 will be \$90/mo on a one-year lease, including maintenance. Purchase price is \$3,750.

Delivery will be in 30 to 60 days from 610 Parkway, 94086.

#### Bendix Shows Portable CRT

SOUTHFIELD, Mich.—Bendix Interactive Terminals Corp. has introduced a portable CRT computer terminal.

The Logiport 2 terminal has a 16-line display with 80 char./line and a non-glare, 5 in. by 7 in. screen.

Standard features include teletypewriter compatibility, roll or page mode, full- and half-duplex operation and automatic key repeat.

The Logiport 2 costs \$2,450 from Bendix Corp., 48076.

#### Terminal Contains Card Reader

NEW YORK—Panasonic has a data entry terminal that contains an optical card reader to read punched cards or badges.

The unit reads the data on the card or badge when it is inserted into the terminal and transmits the data serially along with variable data and simplified data entered through optional numeric keyboard and thumbwheel switches.

Price starts at \$1,800. Delivery begins at the end of June from Matsushita Electric Corp. of America, 200 Park Ave., 10017.

## Reservation Data Base

# 370 Net Handles Hilton Room Status

By Ronald A. Frank

of the CW staff  
DALLAS—If you wanted to keep track of all Hilton Hotel room reservations, you would probably have two 370/145 handling a national communications net.

That is exactly what Compass Computer Services handles the Hilton reservation system. The company uses the dual 145s to house a data base containing the room status for both U.S. and domestic hotels in the Hilton organization.

The 370s are interfaced with two CDC 1700 CPUs. The 1700s poll a network of 300 CRTs operating on private lines with another 70 displays connected to the Dallas DP center through dial-up facilities.

#### Built-In Modems

The terminals, supplied by Terminal Communications, Inc., have built-in Bell 202-type modems, according to Norman Crane, communications manager at Compass, and transmit at 1,800 bit/sec on the private-line facilities and 1,200 bit/sec on dial-up lines.

In addition to the modems there is a printer to allow each remote site to get the latest room reservation information from the Dallas center. The private-line system uses 11 C-2 conditioned 3002-type lines from Bell.

Each remote terminal is polled for 18 hr/day, at 10-second intervals, by one of the 1700 front ends. The data is transmitted to the 1700 in ASCII, and transferred to the on-line 145 through a special CDC data communications channel interface.

The interface box is connected directly to the selector channel on the 145. The special CDC software makes the 1700s simulate a 145 to interface to the mainframes. There are two complete systems for redundancy, and each 1700 can interface with both 145s.

The data transferred by the CDC chan-

nel interface is converted from ASCII to EBCDIC inside the mainframe, processed and then converted into ASCII before it is sent back to the 1700, according to Al Gallardo, senior programmer/analyst at Compass.

Each Hilton Hotel and reservation center has a terminal and the system continues to expand, according to Crane. For the future he is considering the addition of remote multiplexer/concentrators to batch the inputs from several remote sites. But the concentrators will not be added until an extensive equipment evaluation is done.

At present, the nationwide network uses telephone company lines but Crane will consider the specialized carriers when their services become available.

The room reservation data base uses independent applications software from Unicom Systems Co. The software is

housed in the 384K of storage included with each of the 145s.

Although the exact traffic on the system varies according to the time of day in each time zone, the daily rate is high. On a typical West Coast private line with 25 CRTs, about 7,000 transactions/day are handled, Crane said.

In addition to booking new reservations, the network supplies a list of expected guests to each hotel when the terminals come online in the early morning.

In addition to the domestic communications system, Compass handles telegraph traffic from international hotels in the Hilton chain. These messages are transmitted through the TWA telegraph network and Compass maintains a link to the TWA system in Kansas City.

The international room information is handled manually and converted for entry into the 370 data base.

## Store Checkout Systems Perform At Supermarket Institute Show

DALLAS—Several store checkout terminal systems were introduced here recently at part of the Supermarket Institute convention. Litton Industries, Bunker Ramo and Electronic Laboratories announced systems designed to interface with a CPU in the store environment.

Litton, New York City, showed its Superregister which can be adapted into a minicomputer-based system using scanners for the Universal Product Code (UPC). The terminal can accumulate totals for 12 store departments, separate sales from non-sales items, calculate taxes and perform other checkout functions.

Each terminal includes a read only and random access LSI memory. About 10K

bytes of ROM and 512 bytes of read/write storage are included in each checkout unit to perform all required calculations.

The terminals can be interfaced with minicomputers for "back room analysis," a spokesman said.

The terminal will cost about \$3,000 to \$3,500.

Bunker Ramo, Oak Brook, Ill., introduced an enhanced version of the store terminal developed previously by Nuclear Data for Star Markets. The expanded electronic store information system (Eais) includes a dot matrix printer with larger type and an on-line numeric interface. The terminals also can operate off-line if the Eais CPU malfunctions. A 10-terminal Eais system will cost about \$42,000, a spokesman said.

A portable system was shown by Electronic Laboratories, Inc. for "business information collection." The System 900 includes a hand-held calculator-type key entry unit which records data onto a battery-powered cassette. The complete system including a transmitter console to send the batched data to a remote site costs about \$1,800.

The cassette information can be transmitted directly to an IBM 2701 line controller or the system can operate on-line with an IBM 360/370 multiplexer channel. Input can also be sent to a System/3 or System/7 processor.

A receiver converter unit can poll remote sites with batched data onto the cassette store. The full polling system will cost about \$15,000, a spokesman said. The company is at 3661 Yellow Creek Road, Akron, Ohio 44313.

## Terminal Takes Charge Over Card

CLEVELAND—A point-of-sale transaction terminal that can validate credit cards by reading either embossed character or magnetic stripe code information is available from Addressograph Multigraph Corp.

The Amcvt-1 terminal can accept data from a credit card or keyboard. The key-entered data detailing the current transaction is displayed for verification by the operator.

The terminal includes a 128-character message buffer which stores all pertinent transaction information. The data can be transmitted over lines operating in private-line polled networks.

The terminal includes an imprinting option that can print and scan OCR 7B font characters. The terminal can transmit data at 300 bit/sec in ASCII format, using

a communications module.

The Amcvt-1 can be configured as part of a terminal management system that includes a message concentrator with a built-in minicomputer. This configuration includes the necessary software to poll remote terminals and performs line control functions.

The concentrator with modems, cassette storage unit, TTY and software costs about \$90,000 without terminals, a spokesman estimated.

The mag stripe reading conforms to American Bankers Association standards while the embossed reading follows the current ANSI numeric standards. The basic system cost \$12,500 from 20600 Chagrin Boulevard, 44122.



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## Remote Batch Terminal Configurations Interact With 360/370 Mainframe Sites

Two remote batch terminal configurations that can interact with IBM 360/370 mainframe systems have been introduced recently by Keane Associates and Digital Equipment Corp.

Keane Associates, Wellesley Hills, Mass., has a remote batch terminal that emulates IBM 2780-type terminals.

Called the System/4 RBT, the unit can handle binary synchronous transmissions up to 9,600 bit/sec between remote locations and sites with 360/370 CPUs. The terminal is also compatible with the firm's System/4 processor.

A typical remote batch configuration using a 4K System/4 CPU, with dual tape cartridges, CRT display, card reader and line printer costs \$15,420 or \$335/mo.

The terminal can support BTAM, TCAM, CICS, Bsp and other IBM software. In an on-line mode, the input from magnetic tape or the card reader is transmitted at 2,000 bit/sec using Bell 201-type data sets. In the receive mode, the terminal formats records for on-line printing or translation to tape.

### Off-Line Use

As an off-line system, the terminal can be used for data entry,

tape editing and other functions which batch input data for later transmission.

Options include automatic line turnaround, auto answerback and vertical format control on the printer. First deliveries are scheduled in May 1973 from 39 Washington St., 02181.

DEC, Maynard, Mass., has introduced a remote job entry system using a PDP-8/E designed for educational applications.

Called the Edu-Batch terminal system, it includes a binary software emulator mode interface,

teletypewriter and card reader. The system can access 360/370 mainframes and can be used in such applications as the instruction of business data processing administrative jobs at schools and colleges.

The terminal system can operate over private and dial-up lines at speeds up to 4,800 bit/sec. Peripheral devices supported by the mini-based terminal include a card reader, paper tape reader/punch and either a dot matrix or line printer. The basic system costs about \$15,020.

## Intel Modems 202C-Compatible

BURLINGTON, Mass. — Intel, Inc. has introduced two integral modems which are Bell 202C-compatible and capable of up to 1,200 baud over dial-up telephone lines.

The Model 2020 is Bell 202C-compatible, while the Model 2021, which includes a 5 baud reverse channel, is Bell 202C-compatible.

Both models include answer-back tone generation, automatic answering, Mark hold on forward channel receive data when carrier is lost, receiver squelch and soft carrier turn off.

The two models operate via a CBS Data Access Arrangement

following typical Bell 202C call establishment procedures.

The Model 2020 is priced at \$330 in small quantities; the Model 2021 at \$440. Volume deliveries are now being made from 6 Vine Brook Park, 01803.

### Documentation Has Interface

MELBOURNE, Fla. — Documentation Inc. has introduced its CC-2400 communications interface for serial transmissions.

The unit provides six switch-selectable data rates from 110 to 2,400 bit/sec.

The CC-2400 costs \$1,050. First deliveries will be in July from P.O. Box 1240, 32901.

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## A Forum and a Means to 'Integrate'

# Group Offers Seminars, 'Equal Rights' for Users

By Michael Weinstein  
or the cv staff

NEW YORK — When President Nixon speaks of the forgotten Middle American, what he is really referring to is the System/3 user, Al Del Gardo, DP director of Excell Plastics, believes.

To correct this situation and bring S/3 users into the mainstream of the computer community, Del Gardo and other New York area S/3 users believe their organization, Guidance International, will fill the bill.

Presently, Guidance has about 150 members who participate in monthly meetings and periodic seminars.

The purpose of the meetings is to provide a forum for the users to communicate their experience and listen to guest speakers, Del Gardo noted.

For example, at a recent meeting Walter Carlson, president of the Association for Computing Machinery, spoke about prof-

itability of the S/3. At another meeting Dr. Herman Limberg of the New York City Department of Administration spoke on handling data base applications.

A seminar last year featured an IBM user who over six sessions helped educate Guidance members on RPG II. Specifically,

### The Small Systems User

he addressed how to make changes in the programs from the console.

"A similar course might cost attendees about \$300 if they attended an IBM school," Del Gardo estimated, "but for our members the cost was only \$5 a session or a total of \$30 for the entire course."

Guidance International was formed in 1966 and originally was designed for 360 users. In 1968 it was incorporated in

the State of New York as a non-profit organization and started directing efforts partially toward the S/3 user.

#### Indifference Noted

"A problem we found in our initial attempt was the indifference of the large association such as the DPMA to give the small user equal representation.

"Sure, they were willing to accept our dues, but there was not a great deal of effort by the larger societies to offer us any services," Del Gardo said.

"To some extent, the individual S/3 user was responsible for this as he seemed afraid and in awe of the large and sophisticated users at shows and national seminars.

"Somewhere the S/3 user came to the notion that he did not belong, and partly for this reason very little effort has been made to integrate him."

But this is changing, according to Del

Gardo. Just recently Guidance received a promise from the Data Processing Management Association for proportional representation on panels for the S/3 user.

At the same time American Management Research is starting to formulate seminar programs that will specifically be directed to the S/3 user.

Guidance is planning to go national, but "right now, we are talking to a group of users in North Carolina who are setting up a chapter. Further, we have had inquiries from the San Francisco area and St. Louis area," he added.

The problem and danger in going to a national organization, according to Del Gardo, is the temptation to move too fast and forget the original goals. "To avoid this problem, we are going to make sure that each branch is fully functional and integrated into Guidance before we move on to the next chapter," he noted.

Other S/3 users interested in the concept or wanting to learn more about the Guidance International Organization can write Del Gardo at 261 5th Avenue, 10016.

## Tight Control Cuts Film Loss

MEMPHIS — Officials of Motion Picture Laboratories, Inc. here are attacking the problem of film loss and controlling a raw film inventory with a small computer.

"We are recovering in a few months the total cost of our computer," said Frank McGeary, MPL president, "in closer control of the tens of thousands of dollars worth of film losses we've experienced in recent years."

MPL is a motion picture processing lab handling feature films, industrial and training films, documentaries, etc.

The computer monitors the printing of 25 kinds of raw film on each of the automated, high-speed film printers, he said. This monitoring gives management moment-by-moment control of its raw film inventory and provides a counter-check on MPL's billing system.

#### How Much Each Day

"Before we automated the control function," McGeary said, "we only knew at the end of each month how much footage had been lost through oversight, rework or carelessness. Now we know on a job-by-job basis exactly how much raw material we consume each day."

Key to increased control is a small computer to handle all data associated with film printers working two shifts, five days a week, he said.

Each of the Bell & Howell Model C printers is tied to an IBM System/7. The computer prohibits use of any film printer until appropriate data is typed into the system.

An operator keys in his identification number, work order of the job to be printed, machine number, type of film to be used and the number of prints to be made.

Then the computer turns on the printer and counts the actual footage consumed in the job, logging all appropriate information for later recovery.

At the end of the printing run, the operator signs off and the computer turns the printer off, signalling the end of job. At the end of the day, the computer prepares a punched paper tape which contains summary information and data about each job.

This information is used to maintain a perpetual inventory on each of the 15 types of film MPL uses. Job costing information is used to double-check billing processes and tabulate average footage factors per print in each job.

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# SYSTEMS & PERIPHERALS

## Relating Cost to Need

## Backup Power: Who Needs It and at What Price?

By Michael Weinstein  
Of the CW staff

Users contemplating installing an uninterruptible power supply (UPS) system can estimate the initial cost with the formula of \$1 for every watt of power required.

For example, a UPS system for a medium-sized computer requiring 45 kVA would cost about \$45,000.

Such a system would be able to drive two typical IBM System 360 or System 370 processors and related peripherals. As power requirements increase, the

\$1/W relationship decreases so that a system needing 150 kVA would cost less than \$150,000.

For smaller systems—less than 45 kVA—the price per watt will increase, thus, a system needing 25 kVA continuous power would cost more than \$25,000.

But for initial estimates, the \$1/W formula gives users a benchmark for future investigation.

### Two Functions

UPS systems perform two major func-

tions: while the outside power is flowing, they act to smooth out spikes and drops in the line voltage and when the power fails they provide an alternative power source.

Because of the types of problems that

For long periods of time, users must turn to some sort of generator system—such as an internal combustion engine.

### Teamwork

Normally, such a system is used in conjunction with the shorter-term system so the user has one system for the first few minutes of a power blackout and another to take charge for longer periods.

One reason for the two systems is that at the time of the power blackout the backup system must immediately kick in. There is no time to start an engine-driven generator.

Any interruption can result in either equipment damage such as head crashes or in lost or incorrect data being read or written.

The power companies are neither prepared nor willing to design power distribution networks that offer power levels to insure that these problems do not occur.

The utilities argue that providing fail-safe power to computer users would mean large added costs to all electricity users. So far this argument has been strong enough to deter any major effort to improve power quality.

## Analysis

can be caused by a total power blackout a major consideration in investigating UPS systems is the time and efficiency with which they can keep the computer up and running during power failure.

Most battery-based systems are designed to keep the computer operating for one to 60 minutes.

The rationale behind the average 15 minute power backup is that after this time the computer will begin to feel the effects of lost air conditioning and users may feel the effects of lost lighting.

To build a system that would also drive the lighting and the air conditioning would require a much greater power potential and the cost would rise through the \$1/W relationship accordingly.

In the limited time backup system the normal operating procedure is that if the power has not returned in about five minutes, the user has time to orderly shut down his operations.

## Printer/Plotters Make an Entry

- Electrostatic Device
- 1,200 Line/Min, Gives Alphanumeric
- And Plotted Output
- Offered Mini Users

CUPERTINO, Calif. — Two large electrostatic raster scan plotting devices, one of which allows users to mix alphanumeric and graphic output, have been announced by Versatec, Inc.

The two units — Matrix Model 2000 Plotter and Matrix Model 2000A Printer/Plotter — use 20-inch wide paper in rolls 500 feet long.

Plotting can be done in an area 18.56 inches wide by any length up to 500 feet. Principal applications for a plotting capacity this large are expected to be in the area of architectural drawings, IC and PC board layout, weather mapping and plotting geophysical data.

The Model 2000 has 100 nib/in. resolution and a total of 1,856 nibs/in. plotting across the 18.56-inch plotting line.

Two hundred and thirty-two 8-bit bytes compromise one scan of plotting with each data bit relating to one nib in the writing head.

An incremental paper drive stepper motor moves the paper at 0.8 in./sec.

The Model 2000A operates in three separate modes: printing, plotting and simultaneous print/plot.

It has the same plotting characteristics as the Model 2000 and, in addition, can print 232 7 x 9 dot matrix characters across the page from Ascii input data.

The Ascii input is decoded and converted to characters by means of a read-only memory included as standard hardware.

Simultaneous print/plot operation permits 80- or 132-column character printing on one side of the paper and simultaneous raster scan plotting on the remainder of the paper width, or print and plot may be intermixed as desired.

Unit price of the Model 2000 is \$8,900 with the price of the expanded Model 2000A set at \$10,900 from 10100 Bubb Road, 95014.

NEWTOWN, Mass. — An electrostatic printer/plotter designed to interface with most minicomputers is available from Gould Data Systems.

The Gould 5000 prints alphanumeric data at 1,200 line/min and plots graphic material at 3 in./sec.

It has an eight-bit data path for input from the host minicomputer, and includes a 64-Ascii character, 7 x 9 dot matrix font. A 96-Ascii character, 7 x 9 dot matrix font with upper and lower cases and a 128-character, 7 x 9 dot matrix (custom mode) font are optional.

When used in the print mode, the Gould 5000 generates 132 char./line. When used in graphic mode, resolution is 100 dot/in. vertically and horizontally.

Computer printout is on 11-inch wide paper. The unit has a 1000-sheet fanfold paper-handling capacity and accepts 400 feet of paper rolled on a three-inch internal diameter core.

Base price of the Gould 5000 is \$7,600 with printing and plotting software packages and interface hardware packages available for most minicomputer systems from 20 Ossipee Road, 02164.



Gould printer/plotter prints alphanumeric data at 1,200 line/min and plots graphic material at a rate of 3 in./sec.

## Fixed-Head Disk Promises Double Access Speed for PDP-11 Users

SAN DIEGO — For about one fourth the cost, PDP-11 users can receive a fixed-head disk subsystem with twice the access speed of standard Digital Equipment offerings, according to a spokesman for Pacific Microtronics.

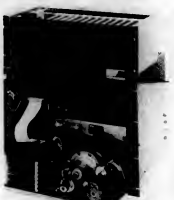
Capacities for the new line of disk memories range from 256K to 8.3M words per device. All units are hardware-compatible and sizes up to 2M words are fully compatible with DEC's Disk Operating Software Program.

Each of eight intermediate capacities is available in a single disk module or may be field-expanded from smaller modules.

### Four Times as Fast

Pacific's disk subsystem is offered in either 8.4 msec or 16.8 msec access times with all units designed for 4.1  $\mu$ sec/word transfer rate. This is about four times the speed offered by DEC, the spokesman asserted.

Prices range from \$10,000 for a 256K-word subsystem with a 16.8-msec access time to \$36,000 for a 2M-word subsystem with the faster 8.4-msec access time.



Fixed-head disk subsystem can build up to 8.3M words of on-line storage.

Comparably sized DEC subsystems would run about \$14,000 and over \$70,000 respectively and are only offered at the slower 16.8 msec access time, the spokesman concluded.

Deliveries run about 60 to 90 days from 5037 Ruffert St.

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## Can Be Cheaper, Faster

# Some Plotter Users 'Could Do Better With Printers'

By Michael Weinstein  
of the CW staff

**BOSTON**—Many users presently using plotters to produce blueprints or for other large drafting applications could perform the same functions at about one-fifth the cost with electrostatic raster printers, according to John Nilsson, director of Decision Graphics Inc. (DGI).

In his own architectural operation, Nilsson uses a Gould 4800 electrostatic printer driven by a PDP-15/20 with 32K words of core memory and two fixed-head disk subsystems with a total of 500K words of on-line storage.

One function of this system is to produce architectural drawings for DGI's parent firm, Perry Dean & Stewart.

Drawings are produced by taking output from the electrostatic printer, which prints in strips 7-1/2 in. wide, and taping these strips together to form larger drawings, Nilsson explained.

For example, a final drawing 48 in. by 45 in. is made by aligning and carefully taping six strips of printer output, each 48 in. long, he said.

The taped composite drawing is then taken to a photographer who provides Nilsson with a positive for use in producing additional drawings with a blueprint machine.

### 'One-Fifth as Costly'

"When we compared our method with the conventional method of producing computerized drawings—using a flatbed plotter—we found the electrostatic approach is about one-fifth as costly in equipment alone," Nilsson said.

In plotter applications for large drawings users must take the equipment off-line, and thus must buy a tape unit or some other storage device to drive the plotter. A typical system might cost about \$50,000," he said.

"And electrostatic printing can also be used for alphanumeric printing while the plotter user generally needs a separate printer which must be added to equipment costs," he said.

Added to the cost advantages, Nilsson also stated there is a marked speed advantage when using electrostatic printers.

"For large drawings, a plotter might take well over an hour to produce the final drawing. The same drawing can be produced in strips by our printer in about three minutes. Even if it takes someone 10 to 15 minutes to tape the strips we are still over an hour ahead of the plotter," Nilsson said.

Another problem inherent with plotters, according to Nilsson, is that they depend on the mechanical use of pens which can dry up and skip in the middle of a drawing.

"If this happens, the entire drawing is lost and the user must start again," he

said.

As to the quality of final drawings—plotter vs. electrostatic printer—Nilsson stated there was not a crucial difference in his application.

"While it is true that the plotter approach produces sharper lines," he said, "the photographic process and the blue-print machine tend to close the dots printed by the electrostatic printer so that the final drawing looks like it was drawn with continuous lines."

"Presently, we are using this process to design buildings for the U.S. Army and all final drawings have been up to military and government standards," he added.

For users contemplating this approach, Nilsson said, the software needed to produce the strips from which drawings are made is generally available from the printer supplier.

### Machine Language Used

"Initially we tried to write our own code in a higher level language (Fortran) but it became too complex and required too much time for execution. The only practical approach is to have the software written in machine language," he said.

"Concurrent with our activities, Gould was working on providing a similar software capability written in machine language for the PDP-15. When we learned of their efforts we cancelled our project and adopted their software. This has been used quite successfully with some modification," Nilsson concluded.

"Thus, I am sure that software exists for PDP-15 users but I also think that the vendors—primarily Gould and Versatec—have written similar programs for other mainframes."

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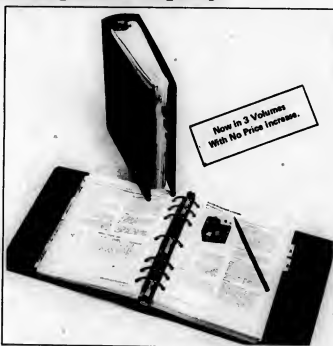
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## NCR Cuts Rental On 50, Reduces 50, 100 Purchase

**DAYTON, Ohio**—NCR 50 users can reduce rental charges on their systems through a new extended-term rental policy. NCR has reduced the purchase price on both the 50s and Century 100s. The company is offering three- and five-year rental contracts on Century 50 systems based on less than 100 hr/mo system usage.

The three-year plan, covering a basic 16K-byte system with an 8.4M-byte disk storage subsystem and a 200 line/min printer, will rent for \$1,450/mo.

For a five-year contract on the same system, the rental will be \$1,350/mo. Usage above the 100-hr contract limit is billed at \$3.50/hr.

### No Change Here

NCR's previous one-year rental contract based on a 200 hr/mo usage at \$1,575/mo remains unchanged. Further, rental contracts based on the 100 hr/mo usage are not available on a one-year lease.

But users who currently have one-year lease plans can convert to extended-term contracts.

Concurrent with the release of extended-term plans, NCR has reduced the purchase price of the Century 50 from \$85,000 to \$71,500.

NCR Century 100s have also been reduced from \$105,000 to \$89,000, a 15% savings.

## Tape Winder a 'Sidewinder'

**ANDOVER, Mass.**—Paper tape users can obtain an electrically driven tape winder for spooling long tapes from Peripherals Graphics, Inc.

The Sidewinder has a 7-in. tape reel which allows users to wind up to 800 feet of tape in one operation.

Price of the winder is \$49.95 from Shelton Industries, York St., 01810.

## Special Interest Groups Plan Meetings During NCC

NEW YORK — With only one national industry-wide show this year, several special interest groups will be capitalizing on the opportunity to hold meetings before, during and after the regularly scheduled National Computer Conference (NCC) sessions.

The ACM has scheduled a member/officer forum on Wednesday, June 6, from 5:30 — 7 p.m. The main emphasis will be on questions and comments from the members, although the officers will also be prepared to present specific items for information and feedback. Jean Sammet, vice-president, will chair the meeting.

Also on Wednesday, from 9 — 12 noon, the Community/Junior College Com-

mittee will hold an open meeting to discuss educational problems. The ACM Standards Committee is scheduled to meet Tuesday afternoon, June 5, the IEEE Computer Society's Stan-

### Societies/ User Groups

dards Committee will convene at the same time.

The special interest groups of the Association for Computing Machinery have scheduled meetings beginning Monday, June 4 through Thursday.

These include meetings on Monday of the Joint Users Group, 1-5 p.m.; SigCosim (Computer Systems Installations Management), 6-7 p.m.; SigUCC (University Computing Center), 7-10 p.m.; SigOps/IEEE Technical Committee on Operating Systems, 8-9:30 p.m.; and SigCue (Computer Users in Education), 8-10 p.m.

On Tuesday, 8-9 a.m., the SigOps will

have a business meeting. At 4:30-5:30 p.m. Student Chapter Representatives will meet, and from 6-7 p.m. SigLash (Language Analysis and Studies in the Humanities) will assemble for a business/technical meeting.

Wednesday's meetings include SigSim (Simulation), 7:30-9:30 a.m.; SigBDP (Business Data Processing), 7:30-9 a.m.; SigCue (Computer Users in Education), 8-9 a.m.; and Chapter Chairmen, 8:30-12 noon.

From 9-12 noon SigArch (Architecture of Computer Systems) will meet. Other Wednesday meetings include SigDoc technical meeting (Social and Behavioral Science Computing), 1:30-5:30; SigArt (Artificial Intelligence), SigBio (Biomedical Computing), SigComm (Data Communication), and SigMe (Measurement and Evaluation), all from 8-10 p.m.

On Thursday, SigPlan (Programming Languages) convenes from 8-10:30 p.m. The ACM Council meeting begins in the evening, 8-11 p.m. and reconvenes Friday at 9 a.m.

## CSMA Conference To Visit 5 Cities

WILMINGTON, Del. — The second annual National Communications Week sponsored by the Communications Systems Management Association (CSMA) will cover five cities in as many days, June 25-29, starting in New York City and moving through Philadelphia, Washington, D.C., Chicago and San Francisco.

The theme of the conference is "data and voice communications, user selection techniques" and includes programs on the total systems approach to planning, evaluating and selecting a communications systems.

The tutorial part of the program features such topics as "identifying systems objectives," "selection criteria," "systems synthesis," "effectiveness vs. efficiency" and "cost vs. performance."

CSMA is at 1102 West St., Suite 1003, 1901.

### ACM's Sigplan/Sigmicro Set Languages Meeting

NEW YORK — Topics to be covered at ACM's Sigplan/Sigmicro Interface Meeting, scheduled for May 30 — June 1 at the Arden House in Harriman, N.Y., include "functional memory-based dynamic microprocessor for higher-level languages," "language-oriented instruction sets," "a general-purpose high-level language machine for minicomputers," and "Basic semantics: microprogramming as a tool for teaching programming languages."

Fees is \$30 for ACM members; \$35 for (non-ACM) Sigplan or Sigmicro members; and \$40 for others. Vice-chairman for the meeting is Dr. Stanley Habib, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn, N.Y. 11201.

### Virginia DPers Join Forces

RICHMOND, Va. — This city's DPers, in conjunction with all other municipalities throughout Virginia, have formed an association titled the Commonwealth of Virginia Information Systems (Covis).

The association will provide a means for its members to exchange information, experiences and concepts. Covis will also participate in the development of government information systems.

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## Training Available?

# Demand for Beginning Programmers Continues to Grow

Despite the present market conditions, the demand for computer programmers is expected to continue to grow. The American



J. Daniel Couger  
On  
Education

Federation of Information Processing Societies conducted an exhaustive study last year to determine just how many people were in the data processing field. The study, by Bruce Gilchrist and R.E. Weber, showed 1 million people employed in the field,

including 150,000 systems analysts; 210,000 programmers; 200,000 computer operators; and 440,000 keypunch operators.

The Gilchrist/Weber study produced results remarkably close to those made by the Bureau of Labor Statistics in the Occupational Outlook Handbook. The BLS study was based on average staffing size per particular size of CPU, the numbers of the various size CPUs in use and correction factors for productivity changes. The Gilchrist/Weber study analyzed a variety of sources, from both government and industry.

The BLS study indicates a strong demand for programmers through 1980: an average of

23,000 will be needed each year. This demand is comparable with that of other professional occupations for the same period.

The key question, of course, is whether the present educational programs are producing above or below the average annual forecast demand of 23,000 programmers. Although precise figures on entrant programmers are not available, another Gilchrist/Weber study estimates that only 5,000 out of 7,500 persons with associate degrees in data processing entered the DP labor force in 1971. There should be a high correlation between associate degree graduates and business programmer entrants.

Afips has estimated that 122,400 entered the labor force from all computer-related educa-

Occupational Group	1966 Employment	% Growth Forecast 1970-1980	Net Increase in Occupancy	Average Annual Openings (not incl. Transfers)
Programmers	175,000	129	200,000	23,000
Engineers	1,100,000	46.2	400,000	73,400
Accountants	500,000	43.4	220,000	33,200
Systems Analysts	150,000	183	275,000	27,000
Physicians	295,000	53.1	155,000	20,000

The Bureau of Labor Statistics Forecast of Staffing Needs for the Period 1968 to 1980

tional programs in 1971.

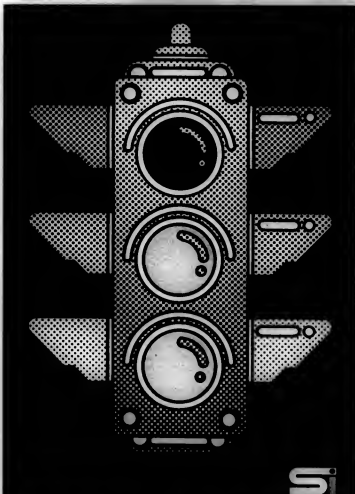
That figure includes not only programming, but all entrants to the data processing field: keypunch, unit record, computer operators, etc. Large numbers of programmers are produced by the private EDP schools. In addition, the computer manufacturers' courses and industry house training provide wide-

spread programmer training.

The past two years saw a drastic "culling" of marginal quality training organizations. On the other hand, the remaining demand reveals ample opportunity for growth of high quality training and education programs.

Couger is professor of computer and management science at the University of Colorado.

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## Civil Service Unit Plans Seminars

### On Retrieval, Fiche

SAN FRANCISCO — Administrators, analysts and programmers in government DP installations will have a chance to learn more about storage and information retrieval techniques, and about computer/microfilm interfaces, at seminars scheduled back-to-back this August, by the regional office of the U.S. Civil Service Commission.

Concepts of storage and retrieval, costs of systems and their advantages/disadvantages will be covered Aug. 20-22. A "systems" approach to using CPUs and microfilm in combination will be the focus of a two-day seminar, Aug. 23 and 24, according to Dataflow Systems, Inc., which is presenting the courses for the commission.

The ADP Management Training Institute at the commission's office, 450 Golden Gate Ave., is handling registrations.

## APL Services Cuts School, College Cost

TRENTON, N.J. — Educational institutions can use the time-sharing facilities of APL Services, Inc. for half the normal commercial rates, under a plan just announced by the company. The special rates only apply in off-peak hours.

APL/Service, the implementation of APL supported by APL Services, is available locally in Boston; Hartford and Stamford, Conn.; New York; Princeton, N.J.; Philadelphia; Washington, D.C.; Richmond, Va.; Miami; and Houston. Under the reduced rate plan, schools and colleges are charged \$4/hr. for connect time, 40 cent/sec. for CPU time and \$17.200 char./mo. for storage, all based on an IBM 370/155.

APL Services is headquartered at 865 Lower Ferry Road, 08628.

## Analysis Course Set

LOS ANGELES — A short course covering modern approaches to data analysis and forecasting will be offered at the International Hotel here June 5-8. Prepared by Technology Service Corp. (TSC) of Santa Monica, the course will examine nonlinear regression, classification analysis, cluster analysis and hypothesis/significance tests.

Emphasis will be on computer-based analysis of multivariate data.

The course fee of \$350 includes materials, texts and luncheons. It is at 225 Santa Monica Blvd., Santa Monica, 90401.



# COMPUTER INDUSTRY

## CI Notes

### SEC Death Seen in 1970

TULSA, Okla. — IBM had decided as early as July 1970 that "the service bureau business is not a sound one for IBM," recently available IBM management committee minutes indicated.

However, the management committee felt it would be "undesirable" to get out of the business in 1970 or 1971 because of the impact on corporate profitability, according to the minutes.

At the same time the management committee decided to investigate various alternatives of getting out of the business.

### DEC Drops Lockheed Suit

BOSTON — Digital Equipment Corp. has agreed to drop its patent infringement suit against Lockheed Electronics.

In the suit, DEC charged that the addressing techniques used by Lockheed's Sue minicomputer infringed on patented techniques for DEC's PDP-11.

DEC said a countersuit filed by Lockheed to block the DEC suit is also being dismissed.

### CA Toots Famous Horn

IRVINE, Calif. — Computer Automation, Inc., maker of the Naked Mini, brought out its air horn to herald new contracts for more than \$3 million. Since the firm moved to Irvine, it has resumed blowing the horn for orders, but only for orders over \$1 million.

Previously, the firm blew the horn for each order over \$10,000, but had to silence the horn because of neighbors' complaints.

## Supershorts

Intel has arranged a \$10 million revolving line of credit with a group of banks for a subsidiary of Intel Financial Corp. The line will be used to finance the receivables associated with the sale of ISS products to OEMs.

Datasah, division of Saab-Scania, has established U.S. headquarters in New York, with C.E. Jacobson as general manager, U.S. operations. The firm is promoting its on/off-line banking terminals and minicomputer products.

Fabri-Tek, Inc. has signed an agreement with Microtek, Inc., Jogjakarta, Indonesia, that will effectively almost double production capabilities through the addition of 800 people to string memory planes and stacks.

Computer Machinery Corp. has named General Computer Services, Inc. as distributor for its products in Puerto Rico, the Dominican Republic, Haiti and the U.S. Virgin Islands.

## 'Predatory Practices'

# Telex Seis IBM Damage at \$36 Million

By E. Drake Lundell Jr.  
of the CW staff

TULSA, Okla. — Before testing its case in its antitrust suit against IBM, Telex financial attorney James Hevener indicated that Telex had suffered damages amounting to \$36.1 million as the result of IBM's "predatory practices" in the peripheral marketplace.

Hevener said Telex had lost \$11.3 million because of cancellations by leasing companies of contracts to buy Telex equipment.

In addition, he said, because Telex had reduced the prices on rented equipment in the field in response to such IBM actions as the 2319 disk drive price cut, this had caused losses amounting to \$92.3 million.

Earlier testimony indicated that Telex had reduced the prices on all installed rental equipment even though IBM had announced the cost reductions only for the 2319-type drive.

Telex had done this because the 2319 was compatible with all of its 2314-type disk drives installed.

In addition, Hevener said Telex had lost another \$257.7 million because it was deprived of its "rightful share" of the market due to the IBM actions such as on the 2319, the fixed-term lease plan and the extended lease plan.

In the case Telex is asking for a treble of these damages, thus bringing the total to the \$12.1 billion figure announced for the case. Treble damages are permissible

in antitrust cases if one firm is found guilty.

The last Telex witness, Steve Jastras, Telex president, noted Telex had had the image of a growth company with in-

At the same time, he said, Telex had been a profitable operation prior to the moves and the IBM actions had made it unprofitable. He indicated the firm would show a loss of \$8 million before taxes for

## IBM Maintenance Profits Drop

TULSA, Okla. — When IBM asked for a maintenance price increase in 1971, which was temporarily delayed by the Nixon Administration's wage price controls, IBM was — in its eyes — in an extremely bad position. But most companies would prefer similar problems in keeping their profit levels up on maintenance.

According to a memo from D.W. Sweeney to P.M. Foley at IBM at that

time, there was concern over the drop in maintenance service profitability in the prior two years.

In all, the gross profit as a percent of revenue had dropped from 52.2% at the end of 1968 to only 46.3% in July of 1970.

However, the net profit as a percent of revenues had dropped more dramatically — from 28.1% to 14.5%.

vestors and the general public, one that was "going to the moon," before the alleged IBM predatory practices.

But the IBM announcements of the fixed-term plan and other product adjustments made users wonder about the viability of Telex and whether it would be able to stay in the business, Jastras related.

After the IBM actions, he said, Telex had had more difficulty in getting loans and also had some trouble recruiting personnel.

At the same time, he said, Telex

In addition, he stated, at the end of 1969 Telex stock had had a value of 19 per share in the market, but after the IBM moves this had dropped drastically and the current value is \$4.63 per share. On cross examination, however, Jastras admitted Telex had changed its method of accounting from the financing system to the operating system during the same time frame and that this was forcing the firm to take some writeoffs now that it would not otherwise have taken.

## Memorex Confirms Financial Problems

SANTA CLARA, Calif. — Memorex Corp. has confirmed earlier reports in the *Wall Street Journal* that it does have financial difficulties and that the Bank of America, its largest creditor, has taken a major role in running its affairs.

The firm also said it is negotiating with firms to sell "a substantial equity interest" or to reach "some other form of business combination."

In addition, Memorex indicated that orders for its MRX mainframe series are "lagging."

President Laurence L. Spitters attributed the slow sales to "the newness of the systems product line to our equipment sales organization, the difficulty of initial entry into the market by a new computer systems supplier whose demonstrated capability isn't in systems products, and the hesitance of prospective customers engendered by adverse publicity regarding the company's financial condition."

Kroger Co. has cancelled an MRX order that would have produced \$800,000 annual revenue, Memorex said.

## Dedicated Application Market Expected to Triple in Five Years

NEWTON, Mass. — The dedicated application market will grow the most rapidly of any sector of the EDP industry in the next five years, according to *EDP Industry Report*, published by International Data Corp. here.

The market research firm estimated the revenues to U.S.-based manufacturers of dedicated application computers, most of which are minis, will triple between 1972 and 1977, growing from \$560 million to \$1.7 billion in 1977.

Shipments of dedicated machines rose 55% during 1972 to \$560 million, setting the pace for continued rapid growth during the next few years, according to IDC. Several factors contributed to the buying spurge, IDC said. The following factors were mentioned:

- "Penetration user demand was unleashed as budgets loosened and the Phase II investment tax credits could apply.
- "IBM began volume shipments of its System/7, broadening the market here rather than increasing competition for the same dollars.
- "OEM manufacturers and systems houses further broadened the demand for minis as these sophisticated function boxes began to show up in terminals, machine tools and small business sys-

tems."

The "average" value of units shipped remained around \$30,000, the same as in 1971, and IDC said it expects this level to continue for the next few years.

Although 50% or 9,400 of all dedicated application computers shipped in 1972 were in the under \$25,000 price class, the total value of these shipments was \$133 million or 24% of the \$560 million total. The \$25,000 to \$50,000 price range had 42% or 7,940 of the units shipped and held 50% or \$278 million of the total value of shipments.

There were 1,200 units shipped in the \$50,000 to \$100,000 price range, accounting for 16% of the total number of shipments, but 16% or \$90 million of the total value of shipments.

Units costing over \$100,000 accounted for almost 11% or \$59 million of the total value shipments, but numbered only 260 units shipped.

As typical systems in the various categories, the report mentioned the Nova and PDP-8/E in the under \$25,000 range; the PDP-8/A, 11/20 in the \$25,000 to \$50,000 range; the IBM System/7 from \$50,000 to \$100,000 and SEL and GE/Pac in the over \$100,000 category.

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## Contracts

Management and Computer Services, Inc. has received a two-year facilities management contract from the West Chester Area School District, Pa.

La Compagnie Generale de Constructions Telephoniques, a French subsidiary of ITT, has received a \$2.2 million contract from Russia's Aeroflot airline, to install message-switching equipment. The system will supply passenger information to Moscow area airports.

Keane Associates, Inc. has received a software subcontract from IBM to assist in the development of an on-line teleprocessing system.

Microdata Corp. has been awarded a contract to supply 1600 minicomputers to Photon, Inc. for incorporation in the Photon Pace Setter System.

Rapidata, Inc. has signed a \$7.7 million, three-year contract with the New York Telephone Co., superseding a one-year contract already in effect. The new agreement covers the addition of dual

processors to each of the two single Honeywell 400 systems now serving the company.

American Management Systems, Inc. has been awarded a contract by New Populist Action, Inc., a citizens' organization founded by former Senator Fred Harris, to develop and maintain a computer-based Membership Information Communications System.

FHD Systems for Computing, Inc. has received a consulting contract from John Hancock Mutual Life Insurance Co. for automation of a claims inquiry system.

Xynetics, Inc. signed a contract with Camco, Inc. to provide Model 2000 automated plotting systems for incorporation into computerized Camco "Markmatic" and "Gradomatic" systems.

FM4 Gila River Corp., which is operated by the Indians of the Gila River Reservation, has received a subcontract from University Computing Utility Co. to assist in data conversion.

## Multinational Earnings

### Nixon Backs Current Tax Laws

WASHINGTON, D.C. — President Nixon has backed the current tax laws governing profits earned abroad by U.S. companies, and essentially added his weight to those opposing the entire Burke-Hartke bill.

"Our income taxes aren't the cause of our trade problems and tax changes won't solve them," he told Congress.

He said the basic system of taxing profits earned abroad is "fundamentally sound. We shouldn't penalize American business by placing it at a disadvantage with respect to its foreign competitors," he stressed.

The President urged Congress to "refrain from enacting broad new changes in our tax laws governing foreign direct investment... (until) we see what possibilities for multilateral agreements emerge" from trade talks between nations.

The current ability of a U.S. firm to subtract the income taxes it pays to foreign governments from its U.S. tax liability would be repealed by the Burke-

Hartke bill, which would also allow the company to deduct foreign taxes from foreign earnings.

Currently, a U.S. company pays U.S. taxes only on profits it brings back to the U.S. in any given year, and can defer taxes on the rest until such time as profits are returned to the states.

Under the Burke-Hartke bill, all corporate income earned abroad would be subject to U.S. income taxes in the year it is earned.

Mr. Nixon pointed out that other firms would fill the vacuum if U.S. firms were not abroad. If U.S. firms are hindered in taking advantage of "investment opportunities abroad, we can only expect that foreign firms will seize these opportunities at our expense," he warned.

## L.D. Altman to Assume Fabrik-Tek Presidency

MINNEAPOLIS — L.D. Altman has been named president of Fabrik-Tek, Inc. He was formerly executive vice-president of the firm. Altman joined Fabrik-Tek from Control Data Corp., where he had been a corporate vice-president and general manager of the western division.

### Other Moves

■ Gene Nicholl has been named president of DFA, Inc., a DP equipment leasing subsidiary of Pioneer Texas Corp. A former employee of DFA, he served with the firm for almost five years and was a vice-president before resigning in 1962.

■ Dr. Robert Worsing has been appointed vice-president, development and operations, for the Infonet Division of Computer Sciences Corp.

■ John B. Jackson has been elected a vice-president of IBM, where he continues as president of its Federal Systems Division. He joined IBM in 1954 and has acted as president of the Federal Systems Division since 1964.

■ Charles R. Williams has been appointed vice-president, western operations, for Sperry Univac. He was formerly director of field marketing for the firm's western operations. In his new position,

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## Executive Corner

he will be responsible for all marketing and services operations in 11 western states.

■ Lockheed Electronics Co., Inc. has appointed two new vice-presidents: Arthur H. Benner is company vice-president and general manager, Products and Systems Division; and Matthew E. Tulino is vice-president, assistant to the president.

■ Howard K. Cooper has joined Macrodota Corp. as vice-president, marketing and sales. He was formerly president of Nucleonic Products.

■ George A. Hallenbeck, formerly vice-president, contract programming, for Interactive Data Corp., has been named vice-president, marketing, for the firm. He will continue to coordinate the company's contract programming activities.

■ John R. Coutts, formerly vice-president, marketing, has been named president of Bunker Ramo Corp.'s Information Services Division.

■ Herman W. Pass has joined Terminal Data Corp. as vice-president, technical marketing and new products development. In addition, he will direct the development of advanced laser recording and optical data processing systems.

■ James Clark has been appointed executive vice-president of Terminal Equipment Corp. He was previously vice-president, operations, with Tycom Systems Corp., a manufacturing subsidiary of Terminal Equipment.

## Growth in Diversity of Components

# Semiconductors Called Best for Any Digital Memory

By E. Drake Lundell Jr.  
Of the CW staff

BERKELEY, Calif. — Any digital memory requirement "can best be met using semiconductor technology," according to David A. Hodges of the Department of Electrical Engineering and Computer Sciences at the University of California here.

In a recent paper he noted that at present the diversity of the available components in this area was growing rapidly and the "optimism degree of components varies depending on the required storage capacity and on whether economy (component cost/bit), speed (access and cycle times), or usability (simplicity of timing, logic interfacing and powering) is of the first concern."

### New Developments

At the same time, he said, new semiconductor processing techniques are being developed to improve the characteristics of semiconductor memory components and new forms of memories attractive for use in small systems and terminal applications are appearing.

Prices of large-quantity purchases — over 10,000 units — of semiconductor memory components "range roughly between \$3 and \$10 per component for designs that have been in production for a year or more," while the price of recently introduced devices "may be many times higher reflecting the supplier's attempt to recover development costs."

Price, he said, is less directly related to the number of bits per component than it is to "chip area, package cost, test cost, volume of production and competitive conditions."

The price of mature components, he predicted, will probably remain in the area of the \$3 to \$10 range rather than show radical departures from that level.

At the same time, Hodges forecast that the number of bits on a chip would continue to grow, but the rate of growth would slow down from the doubling every year that has been common in the past decade of the semiconductor memory business.

"The best single indicator of fundamental cost will continue to be the number of bits per component (bit density)," he added.

Today's bipolar RAMs and ROMs have access and cycle times that range from about 10 nsec to 80 nsec, while MOS units have a range between 80 nsec and 2  $\mu$ sec, he noted, adding that "gradual reductions in these ranges are likely over the next few years."

The usability of semiconductor components, he said, is related to clock requirements, power supply requirements and address and data signal levels, and he noted that bipolar memories now available are easy to use since they meet most of these requirements as do the new 1K static MOS RAMs.

"Volatility of stored information used to be cited as a major disadvantage of semiconductor read-write memories," the researcher noted, but he added that "a variety of power supply backup, information storage backup and error correction techniques have been developed which eliminate volatility as a problem" for

most systems.

At the same time, he said, "electrically alterable ROMs are being developed for the few applications where this still is a crucial issue."

Data on semiconductor memory components reliability indicates, he added, that component failure rates now fall between 0.0005% per 1,000 hours and

## What's Ahead?

0.05% per 1,000 hours and that there is no significant difference between the MOS and bipolar units in this area of reliability.

However, to achieve these rates the components have to go through a careful burn-in period at the maximum rated temperatures to catch poor components, and he noted that during these tests as

much as 1% of the units will fail and have to be rejected.

"Continuing attention to failure analysis, quality control in manufacture and screening and burn-in techniques could easily result in an order of magnitude of improvement in field service failure rates over the next few years," Hodges predicted.

At the same time, he claimed that both bipolar and MOS memory components are benefiting from new methods of manufacturing that will give them either higher densities or higher speeds or improve their usability in memory systems.

To date, he said, the memory market has been dominated by RAMs, ROMs and shift registers, but he stated that electrically alterable programmable read only memories would be available in the near future at only a slight increase in price over the more normally available ROMs. Other new types of semiconductor memory involving "additional functional

features obtained by using additional circuitry," in combination with the storage element, will also materialize in the near future, he predicted.

In addition, Hodges noted that "Content-Addressable Memories (CAM) have often been advocated as a replacement for the conventional location-addressed RAM in computer main memories" and that these devices were available to some extent today.

However, he found that "because the bit density is much lower than for RAM, the cost per bit is much higher," but predicted that "intensive development efforts might reduce the fundamental economic difference to a factor of two or so."

But even at this price reduction, he said, "CAM is not likely to find a major place in computer main memories" but will find its place in specialized applications requiring the storage of only a few hundred bits.

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## Growth Seen in Israeli DP

TEL AVIV, Israel — The total DP market in Israel is expected to rise about seven times above its current level in the next 10 years, according to a survey for the Israeli Ministry of Commerce.

An average annual growth rate of 22% is projected for total DP expenditures, with 60% of that figure devoted to teleprocessing and peripheral equipment.

Manufacturing of computers in Israel is expected to reach \$120 million in 1981 from the current level of \$11 million, the survey indicated.

About 65% of production in 1981 would be for export, the survey said.

## Cambridge Results Top 1972 6-Month Earnings Up at 2 Memory Firms

Six-month reports were improved at both Advanced Memory Systems, Inc., with Cambridge Memories, Inc., with Cambridge's revenues and earnings exceeding the results for all of 1972.

Cambridge President Joseph F. Krav attributed the strong half performance to acceptance of the 370/Stor and minicomputer add-on memories, and the firm's steadily increasing rental base.

### Cambridge Earnings Soar

Cambridge's six-month earnings, including a \$62,880 tax

credit, totaled \$258,488 or 20 cents a share compared with \$47,857 or 5 cents a share in the 1972 first half.

Revenues more than tripled to \$4.7 million from \$1.5 million in a comparable year-ago period.

In the second quarter, earnings, including a \$5,880 tax credit, totaled \$140,076 or 11 cents a share, compared with \$79,639 or 8 cents a share in the 1972 period. The 1972 figure includes a \$38,277 tax credit.

Revenues jumped to \$2.8 million from \$872,163 a year ago.

### Increased R&D

Cambridge has increased its R&D expenditures "substantially. We expect these measures

to result in a high rate of new product introductions during the coming year," Krav said.

Advanced Memory Systems' six-month earnings rose to \$1.3 million or 74 cents a share, including a \$616,000 tax credit, compared with a loss of \$38,177 or 4 cents a share in the comparable 1972 period.

Revenues rose to \$13.7 million from \$4.8 million a year ago.

In the quarter, earnings totaled \$695,201 or 38 cents a share, including a \$321,000 special credit, compared with \$287,616 or 19 cents a share in the year-ago period, which included \$150,000 in tax credits.

Revenues for the second period rose to \$7.5 million from \$3.3 million in the same 1972 period.

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## Wang Quarter Earnings Up

TEWKSBURY, Mass. — Wang Laboratories, Inc. posted increased third quarter earnings of over \$1 million, but the nine-month report showed decreased earnings, attributed by the firm to marketing costs for the 1200 cassette typewriter.

In the first quarter, earnings reached a record \$1.1 million or 26 cents a share compared with \$889,598 or 22 cents a share in the year-ago period. Revenues reached \$12.9 million, up from \$9.8 million in the 1972 third quarter.

For the nine months, earnings declined to \$1.8 million or 44 cents a share from \$2 million or

50 cents a share in the 1972 period. Revenues rose to almost \$33 million from \$26.1 million a year ago.

Dr. Ar Wang said nine-month expenses for the 1200 typewriter exceeded income, primarily from short-term rentals, by about \$1 million, but he expects that on a current monthly basis income will overtake expenses by June 1973.

The 2200 "Basic" language programmable calculator is being well received in the market, Wang said, and he anticipates sales of this product will become an important portion of the company's total business in the forthcoming periods.

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## TEC Records 9-Month Earnings

TUCSON, Ariz. — Record sales and earnings have been reported for the quarter and nine-month period ended March 31 by TEC, Inc., maker of CRTs and components.

In the quarter, earnings soared to \$253,082 or 37 cents a share compared with \$87,587 or 13 cents a share in the comparable 1972 period. Revenues climbed to \$2.1 million from \$1.3 million a year ago.

For the nine-month period, earnings rose 207%, to \$475,383 or 70 cents a share compared with \$154,877 or 23 cents a share in the same period last year.

Revenues rose 50% to \$5.1 million from \$3.4 million in the 1972 period, for which figures are restated.

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<p><b>buy.lease.sell</b> 370 &amp; 360 EQUIPMENT</p> <p>CIS PRESENTS ECONOMY IN IBM HARDWARE...and backs it up with most de- voted reputation for service dependability and a penchant for detail. No loose ends. Per- sonal contact with experience superior to the best computer leasing you have ever known. Call for a CIS man now. You know it to be different.</p> <p><b>CIS</b> CONFIDENTIAL INFORMATION SYSTEMS CORPORATION</p>	<p><b>buy.lease.sell</b> 370 &amp; 360 EQUIPMENT</p> <p>CIS PRESENTS ECONOMY IN IBM HARDWARE...and backs it up with most de- voted reputation for service dependability and a penchant for detail. No loose ends. Per- sonal contact with experience superior to the best computer leasing you have ever known. Call for a CIS man now. You know it to be different.</p> <p><b>CIS</b> CONFIDENTIAL INFORMATION SYSTEMS CORPORATION</p>	<p><b>For lease</b> <b>by owner</b></p> <p><b>360/40 G or GF</b></p> <p>Floating point. Direct Control. Decimal Arithmetic. Two Selec- tor channels. Storage protect. With or without I/O set and peripherals.</p> <p>Available July 1973 <b>EDP RESOURCES INC.</b> One North Broadway White Plains, N.Y. 10601 (914) 428-3804</p>	<p><b>BEFORE YOU BUY</b></p> <p><b>GO GREYHOUND</b></p> <p><b>WANTED</b> 360/85's 360/50's 360/30's 2314</p> <p><b>FOR SALE</b> 2345's Text: 3237, 4427, 6586, 6581, 7520, 7920, 16827 2314's</p> <p><b>PHONE:</b> (402) 244-8872</p> <p><b>WRITE:</b> Manager of Retail Equipment Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077</p>	<p><b>BEFORE YOU BUY</b></p> <p><b>GO GREYHOUND</b></p> <p><b>WANTED</b> 360/85's 360/50's 360/30's 2314</p> <p><b>FOR SALE</b> 2345's Text: 3237, 4427, 6586, 6581, 7520, 7920, 16827 2314's</p> <p><b>PHONE:</b> (402) 244-8872</p> <p><b>WRITE:</b> Manager of Retail Equipment Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077</p>
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## Nickels & Dimes

Pitney Bowes' first quarter earnings, which rose 15% from last year, were reduced by \$1.3 million in the first quarter by its equity in losses and amortization charges of Pitney Bowes-Alplex, and by \$652,000 by the losses of its European retail systems operations.

Pitney Bowes expects Pitney Bowes-Alplex to "continue to have losses at least through the balance of the year," President Fred T. Allen said.

\$\$\$

Wavetek is optimistic about the future of its data communications operations, but expects

profitability in the area of data communications operations is "at least six months away," President John M. Thornton said.

\$\$\$

The management of NN Corp. is paying particular attention to the operations of its Executive Computer Systems subsidiary, where revenues "have not materialized as rapidly as anticipated," the firm said.

\$\$\$

The board of directors of Graham Magnetics has authorized the company to purchase up to 50,000 shares of its outstanding common stock on the open market to be held as treasury stock.

\$\$\$

National Information Services saw "major improvement in its minicomputer system business in 1972, especially in the area of management information systems designed for small to medium-sized business," President Gilbert D. Beinhoeck said.

\$\$\$

Rapidata increased its annual dividend to 5 cents a share from 3 cents a share last year. The dividend is payable May 21 to shareholders of record May 7.

\$\$\$

### Correction

Applied Data Research had its second consecutive quarter in which software product sales exceeded \$1 million. Earnings for the period totaled \$56,287 compared with \$13,590 in the year-end period, while revenues reached a record \$2.4 million from \$2.1 million a year ago.

## UCC First Quarter Earnings Decline

DALLAS — University Computing Co.'s first quarter earnings figures reflect negligible realized capital gains from insurance operations in the period ended March 31.

Earnings for the period totaled \$2.1 million or 26 cents a share compared with \$11.8 million or \$1.34 a share in the year-end period. Capital gains from insurance operations accounted for \$10.6 million of earnings in the 1972 period.

Consolidated revenue totaled \$25.8 million compared with a restated \$26.2 million in the same 1972 quarter. Operating results were restated to set forth separately results of the sold communications manufacturing and life insurance subsidiaries as discontinued operations, the firm said.

### Income From Units

Results from the units before taxes, corporate overhead and financial costs were \$1.3 million on revenue of \$20.9 million from computing operations, University Computing Utility Co., and underwriting income of \$1.9 million.

million and investment income of \$1.8 million from the Gulf Insurance Company.

No earnings were reported from the Computer Leasing Co., which had \$4.9 million in revenue, as depreciation of equip-

ment is calculated to equal revenue, less selling, administrative and financial costs.

During the quarter, UCC increased by \$3.5 million to \$21.7 million its investment in Data Transmission Co., the firm said.

## Overseas Sales and Rental Revenue Help Boost Inforex 1st Period Net

BURLINGTON, Mass. — Increased sales to its overseas distributors and higher rental and service revenues were cited as helping Inforex, Inc. report first quarter earnings of \$813,000 or 29 cents a share compared with a loss of \$194,000 or 28 cents a share in the 1972 period ended March 30.

The key-to-disk maker's revenues totaled \$7.8 million in the quarter compared with the \$1.6 million reported for the first

quarter of last year, the firm said.

The three-fold gain in other sales as reported a year ago largely reflects increased sales to the firm's overseas distributor network, an Inforex spokesman said.

Keystation shipments during the quarter totaled 2,046. At the end of March, the company said it installed a base with 13,993 keystations, with 826 customers. Inforex said 97 new customers were added during the quarter.

The backlog at the end of March was \$9 million compared with \$11.7 million at year-end, although the keystations were at the same level, according to President T.B. Horgan.

The if sold value of the backlog declined, he said, because of higher first quarter installations of extra-charge features plus a reduction in the selling price of Inforex equipment in Europe.

## New Registrations

WALL STREET COMPUTER CORP., 1212 Ave. of the Americas, New York City, a brokerage house bookkeeping service, filed to register 117,466 shares of common, issuable upon exercise of warrants issued in connection with the acquisition of the assets of Data Decisions Corp.

RECOGNITION EQUIPMENT CORP., 2700 San Antonio Road, Irvine, Texas, filed to register 120,377 shares of common, in exchange for outstanding common stock of Corporation S, at the rate of one-seventh of a recognition share for each Corporation S share.

## Acquisitions

Bunker Ramo has acquired the Electronic Store Information Systems Division of Nuclear Data, Inc. for \$3.2 million in cash.

Negotiations have been terminated regarding the acquisition of First National Indemnity Co. of Cincin, Texas, by Tef Corp.

Airfax Electronics Inc. has reached an agreement in principle to acquire all outstanding stock of American Data Corp. of Huntsville, Ala.

Western Union Corp. has agreed in principle to acquire National Sharedata Corp. in a stock swap valued at \$23.5 million.

Computer Identities Corp. has acquired ACI Systems Corp. from Intermodal Transportation Systems, Inc. for an undisclosed sum of cash and shares of Computer Identities' common stock.

The acquisition of Western Dynex Corp. by Microdata Corp. has been terminated by mutual agreement.

Fabri-Tek Inc. has agreed to acquire Digilog Corp. of Long Island, N.Y. Digilog produces computer educational training systems.

Sedgwick Printout Systems Corp. of Princeton, N.J., has ac-

quired American Computer-graphics Corp. for an undisclosed amount of cash.

Transnet Corp. has absorbed Sigmator, Inc., a California corporation, into Sigmator, Inc., a wholly owned Delaware subsidiary of Transnet for 613,274 shares of its common stock.

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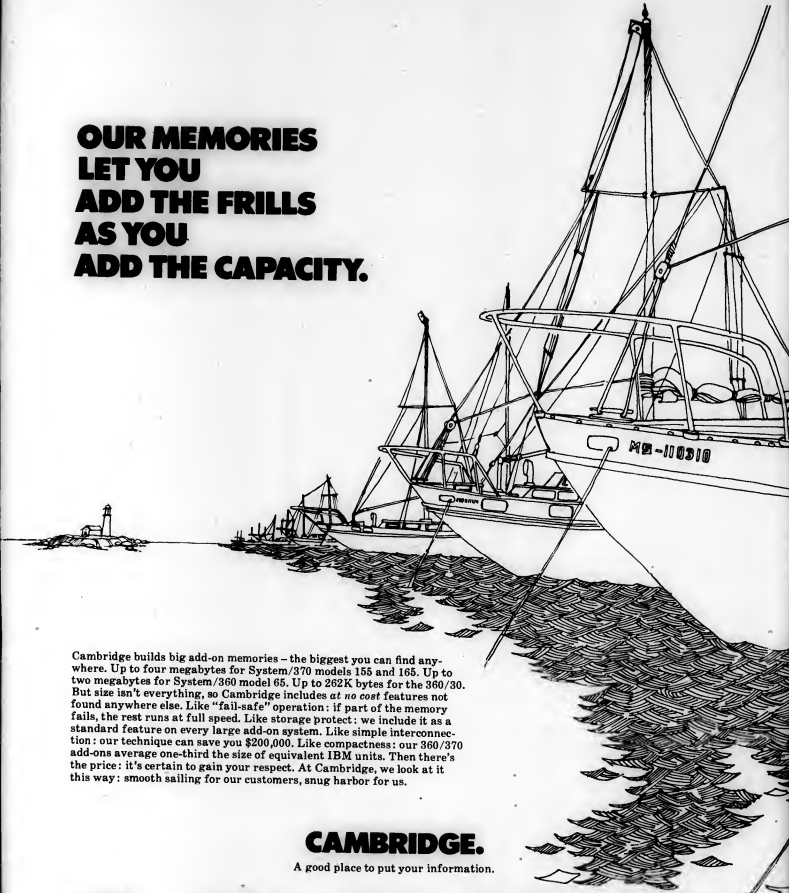
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